MODERN METHODS in the PREVENTION of TUBERCULOSIS.

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B.Sc. (Public Health) 1913.

INTRODUCTION.

As the subject of Pulmonary Tuberculosis has of late years received special attention, notably in the provisions of the much-discussed National Insurance Act of 1911, I feel that there is no apology needed for the title of my thesis, "Modern Methods in the Prevention of Tuberculosis." Apart altogether from the fact that the subject is one of current interest, I hope to point out that the problem of the successful treatment of Tuberculosis and more especially of Pulmonary Tuberculosis, is a matter of overwhelming importance not only as regards the mortality and widespread prevalence of the disease, but also from the standpoint of the "economic value" of the living.

In order to have some idea of the magnitude of the mortality due to Pulmonary Tuberculosis, we may refer to some of the annual returns. Let us take the returns of mortality from the "chief diseases" in one year in England and Wales (1904). As usual we find that pneumonia is the principal cause of death the figures being 43,372. Bronchitis is responsible for 42,188 deaths while phthisis follows closely with 41,851. It is possible that cases of the three diseases mentioned may be entered under the wrong headings as very often "bronchitis" spells "phthisis", while pneumonia is a "heterogeneous collection of separate entities" and many cases of "pneumonia" may be tubercular.

In /

In the above year cancer was the cause of 29,682 deaths, diarrhoea was responsible for 29,674, while Tuberculosis excluding phthisis gave rise to 18,354 making a total of 60,205 from Tuberculosis in all its forms.

If the deaths from pneumonia are omitted, the deaths due to infective disease total 140,431 out of a total of 547,784 deaths from all causes, and as we saw before Tuberculosis in all its forms was responsible for 60,205 deaths, i.e., over 42 per cent of the deaths from infective disease (omitting pneumonia).

Turning to Scotland, the latest available returns at the present time (January 1914) shew that in the third quarter of the year 1913 there were 1808 deaths from all forms of tuberculous disease, or 11.2 per cent of the deaths in the quarter. Of these 1118 were due to phthisis.

As regards the prevalence of the disease, it may be noted in passing that Pulmonary Tuberculosis is almost world wide in its distribution. Neither hot nor cold climates escape its ravages, but dampness, especially if there be a high daily range of temperature, is often associated with phthisis. Cold countries, especially Arctic suffer comparatively little, while towns suffer more than rural districts.

Let us now briefly consider the Pulmonary Tuberculosis from an economic standpoint. Newsholme points out that it is at ages 25-65, and especially /

pecially 25-55 that the worker can hope to pay back the cost of his own earlier maintenance. (1) By personal savings ; (2) By investing Capital in the formation of a home and the upbringing of a family in his turn. The ideal is for the worker to remain at work until all his children are able to earn their livelihood, and until his wife and himself can maintain themselves in their old age. Hence the immense importance of the fact that among men nine out of every ten deaths from phthisis occur between the ages of 15 and 65.

Hayward has pointed out that if Pulmonary Tuberculosis in men were eradicated, close on ten million pounds sterling annually might be saved, taking twenty shillings a week as an average wage. And this statement makes no allowance for the loss due to protracted illness, nor of course for the loss due to the premature death of consumptive women, the figures having been obtained from the "expectation of life" at different ages in males.

Hermann Biggs in 1903 estimated that the cost of Tuberculosis to the people of the United States was $330,000,000 or £60,000,000. He also pointed out that at that time the total expenditure on the care of the patient in the City of New York did not exceed £100,000 per annum, or not over 2 per cent of the total loss by death. He held that if this sum were doubled or trebled it would mean the saving of several thousand lives annually.

One might multiply instances, but I think that I have /

have quoted enough to show the clamant need for successful methods of preventive and curative treatment.

After some discussion of the sources and portals of infection, I shall deal at considerable length with the various methods of prevention and their value, with special reference to the work which has been done in Edinburgh in connection with the Royal Victoria Hospital for Consumption.

The writing of this thesis having been almost entirely suspended for nearly five years, mainly owing to the Great War of 1914-18, some later figures may prove to be of interest.

In the densely populated St Giles Ward of the City of Edinburgh in the year 1914 the number of cases of Tuberculosis notified was equivalent to a rate of 4.6 per 1000 of the population.

An examination of the Registrar-General's statistics for the years 1910 to 1915 (inclusive) shews that the rate of 120 per 100,000 of the population was exceeded in the years 1911 and 1912, whilst in the other years of the period the mortality was slightly below this figure.

The War has brought out some interesting results as regards Tuberculosis. Between the outbreak of hostilities and the end of the year 1918, the total number of men pensioned was 521,697, (295,751 of these on account of disease). Of the men pensioned for disease, 54,883 were claimed by Tuberculosis.

Sources /

Sources of Infection:-

The tubercle bacillus is a short rod, varying from 2.5u to 3.5u in length. It is usually about .3u in thickness. There may be larger forms, e.g., up to .5u in breadth. The rods are straight and slightly curved and may be of uniform thickness, or may shew slight swelling at their extremities. When stained they may be uniformly coloured, or may shew spots which are more faintly stained than other parts. As the organisms are so small, it is very difficult to determine the nature of the spots. Some think they are spores. Against this theory are the facts that many spots occur in one bacillus, that the tubercle bacillus is comparatively easily killed, and that although the younger bacilli stain uniformly and the older bacilli irregularly, the latter do not shew greater resistance than the others.

Muir and Ritchie, however, say thatit is impossible to give a definite opinion on the point, but I think that it is generally held that the tubercle bacillus does not form spores. The organism is non-motile.

The bacilli in the tissues occur either in little masses or are irregularly scattered. Usually a single bacillus is noticed, or a pair of bacilli may be together at an obtuse angle. Occasionally there may be short filaments, and in culture the rods occur in masses, closely applied, and more or less parallel. Old cultures shew larger forms.

Long filamentous forms are sometimes seen, the bacilli are occasionally clubbed or irregularly beaded, and Metchnikoff and others have described branched types of organism.

As it is important from the point of view of recent research, I shall describe briefly the differences between the bovine and the human type of bacillus.

The bovine bacillus is shorter, thicker, and more regular than the human type of organism. The growth is scantier (dysgonic), than that of the human bacillus (eugonic). Egg media are useful for distinguishing the two varieties. On Dorset's medium the human bacillus gives an abundant, dry, wrinkled, warty growth, which is yellow or pink in colour, while the bovine organism shews a thin, white, smooth growth, which is moist and granular. The addition of glycerine favours the growth of the human type while it apparently makes no difference to the bovine bacillus, or may even inhibit its growth.

The usual media for B. Tuberculosis are blood-serum, (for cultures from the body), glycerine agar, glycerinated potato, and glycerinated broth. Cultures must be kept at a temperature of 37 °C, and growth is very slow. Drying of the medium is prevented by covering the cultures with a rubber cap. There is practically no growth on gelatine, peptine agar, etc., or at room temperature. The Bacillus is killed by a temperature of 65°C. in fifteen minutes, by 80°C. in five minutes, by 90°C in two minutes, /

minutes, and in less than this time at boiling point. Direct sunlight kills the Bacillus in a period varying from a few minutes to a few hours, according to the thickness of the layer of material containing it.

Dried expectoration has been found virulent up to the 95th day by Schill and Fischer, while Toma found it to be virulent at the end of ten months time.

Tubercle bacilli stain with difficulty, but retain the stain well.

As a stain for films the following method may be recommended :-

(1) Stain with aniline water fuchsin or with carbol-fuchsin for 2 minutes - boiling repeatedly.

(2) Decolourize with 5% $H_2 SO_4$ or 25% HNO_3 for 2 to 5 seconds.

(3) Wash in 70% alcohol till the film appears colourless. (if it does not occur quickly, repeat (2) and (3).

(4) Counter-stain with either saturated watery solution of methylene blue, or with Loffler's blue 1 part, water 3 parts, for 5 to 10 seconds.

(5) Wash in water.

The above method is practically the same as the Ziehl-Neelsen method.

Recently, Genäsch, Marmann, Neumann and Matson have advised the use of the Much-Gram method, as giving a much larger proportion of positive results than the Ziehl-Neelsen method.

Among other acid-fast Bacilli which should be mentioned are the timothy-grass bacillus, a butter bacillus, Johne's bacillus of pseudo-tuberculous enteritis in cattle, the smegma bacillus, the "mist" bacillus, the leprosy bacillus, and a bacillus which occurs in gangrene of the lung. These must be distinguished from the tubercle bacillus by means of the animal experiments and by culture methods.

The tubercle bacillus was discovered by Robert Koch, and a note on "The Discovery and Cultivation of The Bacillus of Tuberculosis" was contributed by him to the Physiological Society of Berlin on 24th March, 1882. Koch isolated the Bacillus, cultivated it outside the body, and proved that it could produce the same effects indefinitely. By a method of double staining he shewed the bacilli coloured blue on a brown ground. Further, Koch shewed that the bacilli were present in all brown tuberculous lesions and in tibercular sputum. He demonstrated that tubercle bacilli could remain virulent in dried sputum for eight weeks.

Let us look for a short time at the views which have been held at various times regarding Pulmonary Tuberculosis.

Hippocrates (46)-377 B.C.) thought that the disease was due to suppuration of the lungs. Galen (130-200 A.D.) also described it and believed that it was dangerous to pass a day in the company of a consumptive person. Hippocrates, Galen and Aretaeus (about 50 B.C.) and Celsus (about 30 B.C.) also described /

scribed the disease.

Sylvius (1614-1672 A.D.) was the first to recognise that the tuberculous nodule had a relation to the cause of phthisis. He, however, thought that the nodules were the lymphatic glands of the lungs.

In the year 1700, Magnetus described miliary tubercles and demonstrated their presence in various organs. Morgagni (1682-1772) disputed the glandular nature of tubercles, while Reid (1778) wrote of tubercle as products of exudation. Baillie (1793) recognised that the larger nodules in tuberculosis are produced by the fusion of smaller tubercles.

(Bayle (1774-1816) published in 1810 the records of 109 autopsies on tubercular patients. He thought that Pulmonary Tuberculosis was dependent on a special constitutional tendency.

Laennec (1781-1826) denied that tuberculous matter had its origin in inflammation, and was sceptical as regards the importance of bronchial catarrh as a cause of phthisis.

In 1844, when microscopical investigation was in its infancy, Lebert thought that he had discovered special tubercle corpuscles. Rokitansky, who published a book on Pathological Anatomy in 1842, said that tubercles were composed of inspissated proteins. In 1847, Reinhardt, by shewing that the tubercle corpuscles may originate from pus cells, diminished their importance.

In 1847 Virchow taught that caseation was not necessarily /

necessarily tubercular, and in 1852, he limited the term "tubercle" to miliary tubercles. Newsholme says that this great pathologist is chiefly responsible for the "dualist theory", which has done much to hinder the progress of investigation.

Buhl in 1857 shewed that in at least 90% of his cases of Pulmonary Tuberculosis pre-existent caseous masses were present somewhere in the body,and he considered that tuberculosis of the lungs and miliary tuberculosis were due to infection from the caseous masses by way of the blood stream.

In 1843 Klencke produced artificial infection in rabbits, but his experiments did not attract attention. In 1865 Villemin proved that tuberculosis was a specific infection, caused by an inoculable agent. Even in 1867 the Academie de Medicine did not accept his conclusions, which were confirmed by the investigations of Burdon Sanderson in 1868-1869.

Among those who worked later on the suspect of infection were Chauveau and Klebs in 1873, and Baumgarten and Cohnheim in 1880. The work of Martin, Marcet and Tappeiner should also be mentioned. The works of Pasteur on bacteria paved the way for Koch's discovery of the tubercle bacillus. It was not until various attempts had been made that a suitable stain for the bacillus was found by Koch, and the acid-fast nature of the stain was not discovered for some time.

In 1901 Koch stated that the infection of human beings by bovine tubercle was a very rare occurrence, but /

but this view has since been proved to be entirely wrong.

With regard to the production of tuberculosis experimentally, I have already mentioned the experiments of ~~Klevezе~~ Klencke and Villemin. Klencke infected tubercle cells taken from miliary tubercles into the jugular vein of rabbits, and 26 weeks later at the autopsy found tuberculosis of the liver and lungs. Villemin inoculated rabbits subcutaneously behind the ear with matter taken from grey and yellow human tubercle.

He found that:-

(1) Animals thus inoculated developed Pulmonary Tuberculosis.

(2) Control animals which had not been inoculated remained free from tubercle.

(3) Other Animals similarly inoculated with pus from non-tuberculous patients did not develop tuberculosis.

Later he produced Pulmonary Tuberculosis by inoculation animals with caseous material from tuberculosis, with the sputum of consumptives, and with tuberculous material from a cow.

As Villemin had been accused of experimenting on animals already tuberculous, in 1866 he took animals of different species. His inoculation experiments succeeded in nine out of nine rabbits, in two guinea-pigs, in a dog and in a cat, while a sheep, a cock and a pigeon remained immune. Villemin's experiments were repeated by others.

Chauveau proved that tuberculosis could be produced by eating tuberculous meat, and concluded that human /

human and bovine tuberculosis were identical.

Cohnheim at first thought that tuberculosis was not a specific process, but he afterwards studied the evolution of tuberculosis of the iris and cornea, after inoculation of the anterior chamber of the eye. He foretold the early discovery of the cause of tuberculosis. Before this Martin had shewn that true tubercles could be re-inoculated without diminution in virulence. Marcet produced tuberculosis in guinea-pigs by inoculation of tubercular sputum and failed to produce it with bronchitic sputum. He stated that a guinea-pig might serve as a diagnostic agent in doubtful cases. Koch took tuberculous lymphatic glands from freshly killed guinea-pigs, which had been inoculated three or four weeks previously. He then smeared the material on blood serum and inoculated it at 37°C until a sufficient growth of tubercle bacilli occurred. From the cultivation other tubes of blood serum were similarly smeared. Koch cultivated tubercle bacilli in his test tubes in this way through as many as seventy generations.

The inoculation of guinea-pigs and other susceptible animals with such cultures, was followed by lesions identical with those found in the animals which produced the original tuberculous material.

Tubercle Bacilli were found in the lesions which were experimentally produced, and the bacilli were similar in cultural and general character to the bacilli which produced the original disease. Experiments /

Experiments with tubercular sputum, and with tubercular meat and milk, gave the same results.

The names of Fränckel, Watson Cheyne, Wilson Fox, and Dawson Williams should also be mentioned in connection with experimental work on the production of Tuberculosis.

Tuberculosis has been caused in guinea-pigs by making the animals inhale dust laden with tubercle bacilli. Tappeiner carried out similar experiments with dogs. The disease has also been produced in various animals by feeding them with tuberculous material. The lymphatic glands, liver and spleen, the bronchial and posterior mediastinal glands and the lungs may be thus affected, while Baumgarten and Fischer have shewn that tubercle bacilli can pass through the mucous membrane of the intestines even although no local ulcer be produced.

As we have seen that tuberculosis is due to a specific bacillus, and that it has been produced experimentally in animals by inhalation or ingestion, we may naturally assume that a certain proportion of human beings would develop tuberculosis if similarly treated. If this be the case, then there is always some degree of danger of infection when living tubercle bacilli are present in houses or other buildings, even although there numbers may be small as compared with the number of those present in experiments on animals.

It has been assumed by some that each animal's death /

death from phthisis implies the presence of three infective cases among the population.

Even if this be the case, the percentage of infectious cases must be very small, being roughly 0.38 per cent for England and Wales. It is well to bear this in mind as there is a tendency at the present day to exaggerate the danger of contracting the disease.

It is interesting to note that the fear of infection has prevailed from the days of Hippocrates, and that stringent precautions against infection were taken in Italy as early as 1746, and in Naples in 1782 a law for the isolation of consumptives was enforced.

Clinically, cases such as the following may be cited:-

(1) A son lived at home with his parents ; his father suffered for about three years from Pulmonary and Laryngeal Tuberculosis, which caused his death. Three years afterwards, the son developed acute Pulmonary Tuberculosis.

(2) A man lived in childhood with his brothers and sisters. During this period one brother and one sister died of phthisis, and another sister died of "Congestion of the Lungs." When the man was sixteen years old, a sister was sent to an Asylum, where she died of phthisis three years later. At the age of 23 the man left home for five years. He developed /

developed a cough at the age of 26. At the age of 28 he returned home. Two years after this time a married brother attended hospital, having one lung affected by Tuberculosis. There was, however, no chance of infection from the brother. At the age of 32 the patient had a severe haemoptysis.

(3) A girl at the age of 16 noticed that her cervical glands were enlarged. After this the axillary glands enlarged and suppurated for two years. At the age of 24 the patient developed a cough, and tubercle bacilli were found in the sputum.

Her family history was as follows:-

(1) Father died of Pulmonary Tuberculosis when she was eight years old.

(2) A brother died of Pulmonary Tuberculosis when the patient was eleven years old.

(3) A sister died of Pulmonary Tuberculosis when the patient was twelve years old.

(4) Mother died of Pulmonary Tuberculosis when the patient was sixteen.

(5) A brother died of Pulmonary Tuberculosis when the patient was seventeen.

(6) A brother died of Pulmonary Tuberculosis when the patient was twenty-one.

(7) About the same time a sister's case was notified as Pulmonary Tuberculosis and tubercle bacilli were found.

Dr Lecky of the Brighton Sanatorium investigated 100 cases very carefully, and his results are tabulated thus :-

A. /

A.	Definite limited domestic infection & definite onset	20
B.	" " " " & indefinite onset	12
C.	Possible continuing domestic infection & definite onset	7
D.	" " extra-domestic infection & definite onset	7
E.	" " Public-house infection & definite onset	1
F.	" " domestic infection & indefinite onset	4
G.	" " extra-domestic " & indefinite onset	4
H.	No exposure known & definite onset	16
I.	Suspicion of temporary exposure & definite onset	11.
J.	No exposure known and definite onset	9
K.	Suspicion of temporary exposure & definite onset	7
L.	History incomplete after every effort made	2
		100

Sources of Infection:-

Tyndall has proved that in quiet breathing expired air is absolutely sterile, and the breath of a tubercular individual may therefore be neglected as an infective agent.

The possible sources of infection therefore are:-

(a) Inhalation of dried sputum.

(b) Inhalation of moist sputum.

(c) Ingestion of tubercular food.

(d) Infection through the skin, etc.

Koch /

(a) Koch regarded dried sputum as the chief source of infection. His views were upheld by Cornet, Strauss and others. Cornet, however, in one of his writings makes the following observations :-

"Anyone who has himself tried to rub well-dried sputum into particles and to pulverise it very finely, will agree with me that it is no easy task to produce a really fine powder which remains suspended in the air for some time. The strong statements that have been made up to now - that one has only to rub with the foot on the dried sputum to raise immediately a cloud of infectious germs - are absolutely false."

Tappeiner infected dogs by submitting them to the inhalation of powdered tuberculous sputum. Koch and Connet repeated the experiments, but used pure cultures of the tubercle bacillus.

Other observers, however, failed to infect the animals on which they experimented. Baumgarten and Flugge have minimised the importance of dried sputum as an infective agent. Connet maintained that their technique was faulty. Flugge held that the experiments in which sputum is artificially dried and powdered, and the air currents are unnaturally rapid, are not comparable to normal conditions of life. He states that "Infection from pulverised dried sputum is doubtless possible, but it occurs relatively seldom, because particles fine enough to be conveyed readily by air can only be formed from completely dried sputum, and then only in very limited quantities." Neissen shewed /

shewed by experiments that mild currents of air can carry tubercle bacilli from one place to another, and that dried tubercle bacilli can be held for some time in the suspended dust of ordinary rooms.

Cornet found virulent tubercle bacilli in the dust of a room in which a consumptive had died six weeks previously, his samples being taken in a place where the bacilli had settled from the air by gravity. He also produced tuberculosis by inoculating animals with dust from the walls and floors of the room of tuberculous patients.

Coates of Manchester, by a short series of experiments shewed that tubercle bacilli are only present in the immediate surroundings of consumptives. He found no evidence of Tuberculosis in guinea-pigs inoculated with dust from the walls of the out-patients waiting room in a Manchester consumption hospital. His results were also negative when dust taken from the waiting room of a large general hospital and from railway carriages was examined. He found, however, that two samples from a general waiting room at a railway station gave positive results.

Professor Hunter Stewart's view is that only dried tubercle bacilli can be carried in the air by means of dust, and that there is no danger of dust infection. It is interesting also to note that Bacteriological examination of air usually yields only a few moulds and chromogenic organisms.

(b) Koch /

(b) Koch thought that a patient who inhaled fresh sputum which was discharged into the air might be infected, but he pointed out that the particles of sputum did not remain long in the air. Experimentally, Laschtschenko, Flugge and others, after rinsing out their mouths with broth cultures of Bacillus Prodigiosus, found that the bacilli could be caught on culture plates in different parts of the room. Connet disputed the value of these experiments. His contention was that there was no proof that the saliva of consumptives contains anything like the numbers of bacilli as when the mouth is filled with a culture of B. Prodigiosus. He also states "Researchs upon the point shew that the saliva is either free from the Bacilli or contains them in rare cases and in small numbers".

Tubercle bacilli may, however, be discharged by coughing. Fränckel has shewn that the number of the bacilli discharged by coughing is small compared with the number of those ejected by expectoration.

(c) There can be little, if any doubt, that Tubercle Bacilli can pass unharmed through the stomach into the small intestine. This being so, the ingestion of tuberculous uncooked milk, or of tuberculous meat, either raw or cooked insufficiently to destroy tubercle bacilli, has the power of producing Tuberculosis, although in the human being this is not usually pulmonary in its distribution.

(d) It is rare in man to find general Tuberculosis which has been produced by infection through the skin.

Local /

Local tuberculosis may be produced, but rarely extends further than the nearest chain of lymphatic glands.

Other possible sources of infection are soiled hands, the saliva, and the carriage of bacilli by flies.

As regards infection it should be noted that:-

(1) The air breathed by a consumptive in ordinary breathing is sterile (as I have already stated).

(2) All consumptives are not infectious.

(3) A consumptive is not infectious throughout his whole illness.

(4) All consumptives are not equally infectious.

(5) Tubercle Bacilli soon die if exposed to sunlight, and even Cornet admits that a dwelling is usually free from infection in six months.

(6) Only a few bacilli remain alive of those which are expectorated.

(7) Bacilli cannot ~~leave~~ leave moist surfaces, and therefore moist expectoration is harmless unless inhaled in the form of spray, or touched by the fingers, or carried by flies.

Portals of Infection :-

A. Infection by Inhalation:-

The possibilities are as follows :- Bacilli may be inhaled either by the mouth or by the nostrils. In this way they may pass into the adjacent lymphatics of the mouth and naso-pharynx ; they may be swallowed, or may be inhaled into the lungs. From any of the points mentioned bacilli may /

may pass to other parts of the body. There is both experimental and clinical evidence to shew that tubercle bacilli may be inhaled and may find their way, directly or indirectly to the lungs.

The inhaled bacilli, may, however, be checked at the various angles in the nostrils, nasal cavity, pharynx, larynx, trachea and bronchi. In ordinary breathing many may be stopped at the nostrils.

The sneezing caused by the inhalation of foreign bodies also helps to discharge the bacilli.

Further it should be remembered that the cilia of the respiratory passage maintains a steady flow of mucus towards the pharynx. There is a similar flow along the nose. Foreign particles are thus swept into a position from which they may be ejected If, in spite of all difficulties, the bacilli settle in any part of the mucous membranes, they have still to encounter the phagocytes and anti-bodies of the blood. If the bacteria are successful, they pass into the lymphoid tissue and along the lymph channels, finally forming a primary focus of infection.

A lesion need not necessarily develop at the point of penetration. Sidney Martin has shewn in the case of animals fed with Tuberculous milk that a local ulcer only developed after a large dose of infective material, and a smaller dose only caused disease of the subjacent lymphatic glands.

The points of entry of tubercle bacilli may be:-
(a) Adenoids ; (b) Tonsils ; (c) Teeth ;

(d) Larynx ; (e) Bronchial glands ; (f) Lower part of respiratory tract.

Many observers have shewn, either by microscopic examination, or by inoculation, that tubercle bacilli are often contained in adenoids.

G. Morgan in 1899 found tubercle bacilli in the adenoid tissue in from 12 to 15 per cent of his cases of adenoids. In 1427 microscopic examinations of adenoids, Thomson in 1901 found that 5.1 per cent shewed Tuberculosis. Dieulafoy found that the percentage was 5.7. This percentage was increased to 20 by inoculation experiments.

Tubercle bacilli are often present in the tonsils. By the inoculation method Latham found that the central portion of the tonsils of 45 consecutive children, aged from three months to thirteen years, gave evidence of Tuberculosis in seven instances.

On this point Latham has confirmed the work of Woodhead. It is interesting to note that infection through the tonsils is common in pigs.

It is possible that infection may be caused by way of the teeth. G.W. Cook found tubercle bacilli in scrapings from and around the teeth, especially in the young and also in the pulp of decayed teeth. A relative of my own, Professor Stockman of Glasgow, maintains that the tubercle bacillus is the cause of phosphorus necrosis of the jaw, which has its starting point in carious teeth.

It is the exception to find the larynx infected primarly with Tuberculosis. Laryngeal tuberculosis is /

is, as a rule, secondary to advanced Pulmonary Tuberculosis.

The trachea and bronchi are not often attacked. The Bronchial and cervical glands may be infected indirectly through the tonsils (this mode of infection will be considered when I deal later with infection by ingestion.)

Evidence for and against direct inhalation.

Virchow for a long time held that dust could not find its way into the actual lung substance and argued that the pigment in miners' lungs was due to altered blood pigment, and not to carbonaceous matter. In 1866, he, however, changed his views on this subject.

It should be noted that breathing is more rapid during hard work, and that such work may be carried on in a dusty atmosphere. It is thus quite possible that the intricate defences of the lung may be overcome in some instances.

As regards experimental work, St Clair Thomson and Hewlett found that the interior of the great majority of normal nasal cavities is quite aseptic. They confirmed Hildebrandt's experiments, by findingthat in the cases of animals killed in the laboratory, the trachea was free from bacteria. Zenker shewed that the inhalation of red dust by animals produced red colouring of the lung substance. Knauff, after inhaling particles of ultramarine for ten minutes found blue particles in the interior of the cells of his expectoration. Rabbits have been shewn /

shewn to have small particles of carbon in their bronchi, when confined in a smoky atmosphere.

Knauff placed dogs in a large box, into which the fumes of a smoking oil-lamp were conveyed through an opening in the floor.

One dog which was killed after one day in the box, had the whole surface of the mucous membrane, as far as the alveoli of the lungs, covered with a deposit of carbon mixed with mucus. After some weeks other dogs shewed similar deposits in the lungs, while the lymphatic glands were soon affected.

In some animals, which had been in the experimental box for a considerable time, there was a deposit of carbon beneath the pleura. Control animals did not shew these morbid appearances.

Villoret and others in France have revived the view that the pigment in miners' lungs is conveyed to the lungs from the intestine. Van Steenberghe and Grysez fed guinea-pigs and rabbits with food containing coal dust and Indian ink.

At the autopsy on these animals, they found pigment in the lungs only, while the mesenteric glands and abdominal organs were unaffected.

Schultze repeated these experiments. Although he obtained results similar to those obtained by Van Steenberghe and Grysez, he thinks that inhalation cannot be excluded as a cause of deposit of pigment in the lungs.

Schultze introduced pigments into the stomach of a rabbit daily for two months, but post-mortem he found no deposit in the lungs.

Rindfleisch, after microscopical investigation, states that the first lesion in Pulmonary Tuberculosis occurs at the angles and projections where the smallest bronchioles become continuous with the acini. Clinical evidence shews that it is probably the exception to have infective material inhaled directly into the lung substance.

The comparative immunity of the larynx may be due to the coughing produced by local irritation in it, the working away of particles by its active secretion, and to the freedom of movements of its parts.

The fact that disease of the lung is commonly found in knife-grinders, filemakers, potters, copper- and lead-miners, supports the view that direct inhalation of dust does occur, although it must be admitted that the evidence in support of this view is not absolutely conclusive.

B. Infection by Ingestion :-

As in the case of infection by inhalation, the patient may be infected by way of the mouth or naso-pharynx. Sims Woodhead in 1898 made a series of experiments on pigs fed with tuberculous milk. The line of infection in these pigs could be traced from the tonsils and lymphoid tissue of the throat to the neighbouring cervical lymphatic glands, thence to the upper lymphatic glands, and the glands at the root of the neck and the pleura.

Woodhead writes:- "I am driven to the conclusion that /

that this method of infection of the glands of the neck through the tonsils must be a comparatively frequent occurrence, especially in children under insanitary conditions and subjected to various devitalising influences." Infection probably spreads in some cases to the bronchial glands and into the lungs.

Walsham supports this view, and it is noteworthy that in children the parts of the lungs near their roots are often most affected by tuberculosis.

The Bronchial glands are affected either (a) By spread of disease from the cervical glands, and probably from the tonsils, or (b) from the alimentary canal.

Woodhead has traced tuberculosis from an infected mesenteric gland through the retro-peritoneal glands, up through the diaphragm to the post-mediastinal and bronchial glands, and finally to the lung substance.

Guthrie thinks that bacilli which have been swallowed may pass through the esophageal lymphatics to the posterior mediastinal glands.

Squire thinks that the Bronchial glands are more often affected by spread of disease from the lungs, than is generally believed.

Effect of Gastric Juice on Tubercle Bacilli:-

Falk and Wesener's experiment shew that an artificial gastric juice, acting for some hours, does not destroy the virulence of tuberculous material.

Strauss and Wurtz made experiments on

tubercle bacilli with a dog's gastric juice, and found that the bacilli were virulent at the end of from eight to twelve hours time.

Under natural conditions, it is possible that gastric juice may have a more powerful effect on tubercle bacilli, but on the other hand the gastric juice might be diluted by ingested fluid.

No doubt many tubercle bacilli can pass unharmed into the intestine.

I have already mentioned that Sidney Martin's experiments shew that the occurrence of a local tuberculous lesion is dependent on the virulence of the dose of tubercle bacilli.

Cadeac's view is that in the majority of feeding experiments, tubercle bacilli enter by the mouth and pharynx. Muller, however, has found that the mesenteric glands may be primarily infected in guinea-pigs fed on tuberculous milk.

Calmette and Guérin infected the mammary gland of goats with tuberculosis. Kids suckled by these goats acquired intestinal tuberculosis and later the infection spread to the mesenteric glands.

Adult goats, fed with tuberculous material by means of an oesophageal tube, developed rapidly fatal pulmonary tuberculosis, without apparent intestinal infection. There were, however, a few mesenteric lesions. Calmette and Guérin inferred from these experiments that in adults tubercle bacilli may pass easily through the mesenteric glands to the thoracic duct and thence through the heart and pulmonary arteries.

The British Royal Commission on Tuberculosis made experiments on calves which were suckled by cows, whose udders were previously infected by tuberculosis. In five out of six cases, the tuberculosis produced was chiefly mesenteric. In one case general tuberculosis ensued. Cows fed on tuberculous milk developed mesenteric tuberculosis, but in monkeys the same diet gave rise to general tuberculosis.

Delépine has pointed out the value of the lymphatic glands as indicators of the path followed by tubercle bacilli, when the disease has not become too much advanced.

Whitla and Symmers combined the experiments of Van Steenberghe and Grysez, with those of Calmette and Guérin.

Large doses of a living culture of bovine bacilli were rubbed up in an agate mortar with powdered China ink, olive oil and water, till the emulsion acquired the consistence of thin cream. This was then carefully introduced by means of a soft rubber catheter into the stomachs of adult guinea-pigs, precautions being employed whereby soiling or infection of the pharynx and upper air passages was rendered impossible. The animals were killed at periods of from four to twenty-four hours after a single injection and the lungs and viscera examined for tubercle bacilli. These were found in six cases out of eight in a smear taken upon a glass slide from the freshly cut surface of a section of different portions of the lung, after the slide had been stained by the

usual methods. The tubercle bacilli were always sparse and were found usually free in the specimen of lung juice lying amongst an abundance of free or enclosed carbon particles. I have already described the difference between the bovine and human types of tubercle bacillus. In an earlier part of my thesis, I have said that Koch's view that the infection of human beings by bovine tubercle was an extremely rare occurrence, had been proved to be entirely wrong. His views, however, are again receiving support.

Some observers now hold that the 'bovine' bacillus found in human beings is in many, if not most cases, a bovinoid human bacillus. Fearis states that children infected by a bovine bacillus may have been infected by human beings and that the experiments of Fraser, Philp Mitchell, Kaw, Weber, and the British Royal Commission does not prove that the children were infected by cattle.

Fearis is supported in his views by Ralph Vincent, Fearis also writes:- "It has not yet been proved how many, if any at all, of the tubercle bacilli of bovine type found in the tuberculous children were really identical with the true bovine tubercle bacilli of cattle." Carl Spengler demonstrated that, while true Bovine Bacilli are relatively harmless to man, bacilli of the bovinoid type are exceedingly virulent.

Among those who support Spengler's views are Van Baumgarten, Klemperer, Gosio, Kitasato, Koch, Kossel, Mollers, Weser, Emmett Holt, Ungermann and

Burnet. Fearis thinks that some cases of tuberculous infection may be due to cattle, but that in order to prove this, the necessary evidence must be obtained. Nevertheless, he thinks it extremely desirable that every effort should be made to ensure a clean and pure milk supply.

Von Beharing holds that the ingestion of tubercle bacilli of bovine type is the essential cause of tuberculosis.

He says:- "According to my ideas there has not yet been a single well-authenticated case in which pulmonary consumption has originated in adults as the result of a tuberculous infection developing epidemiologically, i.e., under conditions essential for infection occurring in nature."

And again: "The milk fed to infants is the chief cause of consumption."

The view most generally held at present is that tuberculosis in the human being may be, and is caused by either the bovine or the human type of tubercle bacillus.

The interim report of the Royal Commission on Tuberculosis (1907) shews that the Bacilli of the human type are sometimes very virulent to cattle.

Ravenel in 1905 made the following observations:-

"Theoretically, there is no reason why the bovine bacillus should not be readily transmitted to man. It has for all other mammalia on which it has been tried a virulence greatly exceeding that of the human tubercle bacillus. It would certainly seem a remarkable anomaly for man, who is one of the most

susceptible of all animals to tuberculosis to be immune to the most powerful virus known. In the whole range of communicable disease, we have nothing comparable to this state of affairs, should we admit it."

SUSCEPTIBILITY to INFECTION:-

Heredity:- There can be no doubt that certain families shew less resistance to attack by tubercle than others. While the disease itself has not been proved to be transmissible, from parent to offspring, yet heredity is an extremely important factor owing to the strange susceptibilities to tuberculosis mentioned above.

Pearson says "the diathesis of pulmonary tuberculosis is certainly inherited, and the intensity of the inheritance is sensible the same as that of any normal physical character yet investigated in man.

Infection probably plays a necessary part, but in the artisan classes of the urban population of this country (England), it is doubtful if their members can escape the vistas of infection, except by the absence of diathesis, i.e., the inheritance of what amounts to a counter-disposition".

Hippocrates described the tuberculous diathesis thus:- "The form of body peculiar to suspects of phthisical complaints was the smooth, the whitish, that resembled the lentil ; the reddish, the blue-eyed, the leuco-phlegmatic, and that with the scapulae having the appearance of wings."

Environment:- In the first place, one may mention the well-known experiment of Trudeau, who found that rabbits inoculated with tuberculosis rapidly died if shut up in a dark,, damp place without sunlight and fresh air, while others treated in the same way,but allowed to run wild, either recovered or shewed very slight evidence of tuberculosis.

It is a well-known fact that dwellers in the slums of cities are particularly prone to tuberculosis. (In Glasgow in 1914 it was stated that no less than 471,000 people lived in houses of one or two apartments. In 1914 this number of people was more than half the population of the city). Halliday Sutherland has shewn somewhat similar figures, for the boroughs of Paddington, Kensington, St Marylebone, Stepney and Bermondsey. From a report by Maxwell Williamson, Medical Officer of Health of the City of Edinburgh, I quote the following table, which shews tha amount of pulmonary tuberculosis per thousand of the population in relation to the size of houses, for the years, 1910, 1911, and 1912:-

	1910	1911	1912
One-roomed House	6.1	7.4	6.9
Two-roomed house	3.4	4.8	5.6
Three-roomed house	2.1	2.7	2.5
Four-roomed house (or over 4 rooms)	1.0	1.0	1.4

In the same Medical Officer's annual report for 1914 it is pointed out that the incidence of tuberculosis is very much greater in the crowded parts of the city, e.g.:-

CITY OF EDINBURGH.

Character	Ward	Cases notified per 1000 of population.
Densely populated	St Giles	4.6
Densely populated	St Leonard	3.2
Overcrowded	Gorgie	2.8
Very satisfactory conditions	Haymarket	0.6

It should be remembered that Edinburgh is a comparatively small town, and very airy as compared with a town like Glasgow, where the absence of fresh air and sunshine in winter is very marked.

In a lecture delivered before the International Congress on Tuberculosis at Washington in 1908, Sir Robert Philip cited certain facts educed by dispensary operations in relation to two streets in the City of Edinburgh.

In 1914 at Leeds Sir Robert Philip gave an account of the facts regarding these two streets which had been specially watched since 1908.

The facts are as follows:-

(1) In one street of twenty-two rather ancient houses, while every house had yielded one or more cases of tuberculosis, one house consisting of four flats shewed a record of thirty-six separate cases of consumption in eighteen different families.

(2) A short street of nineteen modern houses had afforded seventy-five cases. As in the previous instance, these cases had been distributed more or less uniformly among eighteen houses, but one house had given no fewer than eighteen cases.

Sir Robert Philip also stated that it was not un-

uncommon to have as many as ten or twelve cases from one particular house. Certain localities and streets presented a most undesirable record - the more pronounced "nests" of tuberculosis occurring especially in streets where thorough ventilation is wanting - streets of the cul de sac type.

Occupation:-

In addition to housing and general surroundings, occupation must be considered in relation to susceptibility to Tuberculosis. A table extracted from Dr John Tatham's article Dangerous Trades will shew at a glance the effect of occupation on the mortality figures:-

Occupation	Comparative Mortality Figure - all causes	Phthisis	Other Respiratory Disease.
Agriculturist	602	106	115
Pottery & Earthenware Worker	1706	333	668
Cutler	1516	382	518
File-Maker	1810	402	423
Glass-maker	1487	295	445
Copper-Worker	1381	294	406
Iron & Steel Manufacturer	1301	195	450
Stone Quarryman	1176	269	307
Brass-worker	1088	279	273
Chimney-sweep	1311	260	291
Lead-worker	1783	148	397
Cotton Manufacturer	1141	202	338

Pulmonary Tuberculosis is now rather rare among coalminers, whereas about forty years ago "coalminers phthisis" was a common term. Mines are now, however, very well ventilated, housing conditions are better, and hours of work are shorter.

It has been pointed out that Tuberculosis is very common among indoor laundry workers.

Age. Tuberculosis may occur at any age, but it is most common at the working age of life. As Hippocrates

has pointed out, fatal tuberculosis is most common between the eighteenth and thirty-fifth year. "Surgical" Tuberculosis is very common in childhood.

Sex:- The influence of sex is slight, except in the case of married women, where the influence of pregnancy and lactation has long been recognised as important. James has recently published figures with reference to this subject, based on returns supplied by the Edinburgh City Hospital for Infectious Disease.

These figures shew that the disease is more virulent in married women of the working class than in single women or men of the same class.

Race:- Tuberculosis is very fatal in negroes and North American Indians. The Irish are more prone to the disease than other European races. On the other hand, Jews everywhere shew a low mortality.

Debilitating Influences such as the effects of measles and whooping cough also play their part in the production of Tuberculosis. Diabetes and Tuberculosis are often associated, while trauma may sometimes light up a "smouldering fire."

Nutrition:- The state of nutrition of the individual is an extremely important factor in relation to susceptability to Tuberculosis, hence good food in abundance, is eminently desirable as a preventive measure. The importance of a pure milk supply and the relation of milk to Tuberculosis will be discussed later.

Alcoholism lowers the resistance to Tuberculosis in a marked degree, and in Scotland, Alcoholism is rife in

the overcrowded, airless, sunless tenements of the slums.

War Strain:- The terrible mental and physical strain of the great war has helped to produce thousands of cases of Tuberculosis (vide ante). It would be interesting to know in which categories these men were originally enlisted. Many of the cases have occurred in mwn who were apparently quite healthy on enlistment. In 1917 when I was a member of a recruiting medical board, no man was accepted for the Army, if he had undergone Sanatorium treatment.

Sir William Osler points out that between 1871 and 1910 the death rate from Tuberculosis in England and Wales dropped nearly 50 per cent, and what is perhaps even more striking that the London death rate from consumption declined 33 per cent between the years 1901 and 1910.

He attributes this wonderful state of matters to the following causes:-

(1) Better housing, better food, better habits.

The falling death rate began before the present anti-tuberculosis campaign was begun.

(2) Education of the people in the direction of healthy living, e.g., less drunkenness, less overcrowding, better air and better food. The habits of spitting in public has been checked, and the seeds of the disease are not so widely spread.

(3) Segregation has done much to protect the healthy from the sick.

(4) The cases are seen earlier and the condition is more often recognised before it is hopeless, and there are in consequence more recoveries.

With these remarks in view, modern methods of prevention may be reviewed at some length.

The methods of prevention may be divided into ~~three~~ two great groups, viz:-

(1) Indirect or general measures.

(2) Direct measures, dealing with the subjects of Tuberculosis.

I. It is convenient to discuss the subject of milk supply under group (1), although in one sense it might be dealt with under group (2).

Milk Supply:- As has already been pointed out, differences of opinion exist as to the effect of the bovine bacillus on the human being. Professor Sheridan Delepine is of the opinion that despite the incomplete agreement among observers as to the exact amount of human tuberculosis attributable to the consumption of the milk of tuberculous cows, there is clear and cumulative evidence that cows' milk plays a very important part in the production of tuberculosis both in Scotland and England.

Sir Harold Stiles has stated that the small amount of bovine surgical tuberculosis in Vienna is accounted for by the fact that in Vienna most of the milk consumed is sterilized.

In 1914, at the Public Health Congress in Edinburgh, Philp Mitchell read papers on "The Prevalence of tubercle bacilli in Edinburgh Milk," and "Tuberculosis of Lymphatic Glands in Children". In his first paper he pointed out that his investigations had taught him that more stringent measures should be adopted than those enforced at that time in Edinburgh.

At that time, only one inspector (who was also a food inspector) was detailed to supervise the town and country byres from which the city derived its milk supply.

In his opinion a systematic bacteriological examination of milk samples, combined with inoculation of animals, is indispensable. Until the necessary measures are in working order, the public should boil all milk used for human consumption.

In his second paper Philp Mitchell mentioned that in 80 consecutive cases examined, the bovine bacillus was present in 71, and the human bacillus in 9 cases. These cases all belonged to Edinburgh and surrounding country districts.

Philp Mitchell states that the supervision of byres in country districts is very lax.

Nathan Raw considers that the case of the child is the very foundation of the prevention of tuberculosis and that when tubercular cows are eradicated, the great bulk of surgical tuberculosis will disappear.

Sir Robert Philip found that the "march past" of the contacts in an infected household, (which has been carried out for many years by the Tuberculosis Dispensary in Edinburgh) led him speedily to the conclusion that Tuberculosis was of infinitely greater frequency in childhood than had been formerly supposed.

This view has been confirmed by Professor von Pirquet. His attention was chiefly directed to Tuberculosis in Children. It is the custom in Austria to boil cows' milk before it is used as food. Von Pirquet found that in about 95 per cent of cases occurring in the first year of life, infection took

place by the bronchial passages and only 1 or 2 per cent of the children shewed intestinal infection.

Professor Sims Woodhead has also pointed out the grave dangers of the bovine type of tubercle bacillus.

The ideal milk supply is that derived from healthy cows and uncontaminated either at the place of milking, or in transit to, and exposure for sale at, the milk shop. Cooling of milk prevents multiplication of micro-organisms, but at the present time, when Tuberculosis is so prevalent among dairy cows, and while milk is subject to gross pollution, (e.g., by bacillus coli), the only feasible method is to destroy non-sporing bacilli, such as that of tubercle, by some process of sterilization of milk. The harm done to the milk (pace the vitamine enthusiasts) is negligible as compared with the danger removed.

Sterilization as regards non-sporing organisms may be carried out in three ways:-

1. Boiling of milk for a few minutes. The objection to this method is the "boiled" taste.
2. "Pasteurization", i.e., raising the milk to a temperature of 65° - 70° Centigrade for twenty minutes.
3. Electrification as advocated by Professor Beattie of Liverpool.

Beattie's conclusions with regard to electrification are briefly:-

(1) That the electrical method will destroy disease-producing bacteria.

(2) The main milk-souring bacteria are either completely destroyed, or may be neglected so far as

the keeping power of the milk is concerned for ordinary household use.

(3) There is a reduction in total number of bacteria by 99.93 per cent over a series of 1.5 daily examinations.

(4) The milk will keep perfectly sweet for three or four days after treatment.

(5) The chemical constitution seems to be unimpaired, and the taste is no way altered.

(6) The milk is not only rendered non-pathogenic as regards ordinary bacteria, but in two cases in which the control supply was tuberculous, the electrically treated milk was non-tuberculous..

(7) The milk after treatment is in his opinion perfectly satisfactory as a food.

In addition to sterilization of milk the regulations regarding tuberculous cattle should be more strictly ~~empowered~~ enforced.

Infection by tuberculous meat is probably rare in this country, owing to careful meat inspection and thorough cooking of meat.

We now proceed to consider a very important general measure, viz:- that of

Housing:-

The Prime Minister in a recent speech, (1919) referred to the housing problem in the following terms:- "Housing must be the firs t plank in any sane policy of reconstruction, and it is my intention that it should be first. Housing is the key to many other urgent problems that await solution when

we settle down to peace conditions. I do not agree with those who talk of difficulties in the way, difficulties that are unsurmountable. The same people told us of the difficulties that stood in the way of overcoming the shell shortage. We refused to be frightened by such talk, and in the course of time we attained to an output of shells that left the faint-hearted wondering. In the same spirit we must attack the problems of the house shortage, and we must solve it, for it is the surest way to lay the foundations of peace and contentment at home."

Lord Anderson, the Scottish Judge, in a recent speech (April 1919), said that Scottish housing conditions were rather worse than those in any other country of the United Kingdom.... The principal evils to be remembered were (1) to do away with houses which were uninhabitable and (2) to deal with the evil of overcrowding. In regard to overcrowding there were two problems to be faced (a) site overcrowding, (b) overcrowding of individual houses. Site overcrowding was due to landlords profiteering in human life. In Edinburgh owners of building land had erected houses on every available rood. Wherever it was possible to squeeze in an odd tenement or workshop in certain areas, that had been done, regardless of consideration of amenity or health..... The state of matters in Scotland as regards overcrowding in individual houses was deplorable. Nearly half a million of the people of

Scotland lived in one-roomed houses, and more than two million persons lived together at the rate of more than two persons to a room.

And yet there was sufficient land in Scotland to provide 4 1/3rd acres for every man, woman and child.

It was estimated that to remedy the evil of overcrowding alone 120,000 new houses were required in Scotland. Moreover, if all the one-room and two-room houses which were unfit for human habitation were to be replaced by habitable houses, an additional 115,000 houses fell to be provided - a grand total of 235,000.

The Burgh Engineer for Edinburgh estimated that 10,000 new houses would have to be provided for the City, the cost of which would be nearly five million pounds. The present Government had recognised that as it was hopeless to meet the demand for new houses by the efforts of private enterprise, there had arisen the necessity for communal action. That, of course, Lord Anderson said, was socialism, but it was rational socialism, which was necessitated by a twentieth century community. The proposal that each house was to consist of at least three apartments seemed to him to be open to criticism, inasmuch as there was no provision for the erection of a number of two-rromed houses.

Lord Anderson suggested that the City of Edinburgh Churches Civic Association should appoint two

Committees, one composed of men the other of women. The men's committee should be composed of those who were qualified to criticise the proposals both of the Local Authority and of the Central Authority, and the women's Committee should consist of women who were skilled in housewifery, and who might be able to advise as to the internal arrangements of the proposed houses. Some ardent reformers would fain abolish the tenement houses altogether. It was plain, however, that as far as cities like Edinburgh were concerned that was an impracticable proposition.

In a reference to the Scottish Housing Bill, he said it would have been satisfactory if the Bill had proposed a basis of valuation for the compulsory acquisition of land, such as the Budget valuation of 1909. In the absence of such a statutory basis the prices fixed would be the present market value of the land - a value which had been greatly increased since the war, and which would be less likely than in the case of other values to recede to the pre-war standard. He would have welcomed a clause in the Bill making it imperative on Local Authorities to acquire and reconstruct all slum properties. The prospective policy as to housing was to deal with slum property after all the necessary new houses had been built.

If, however, Local Authorities were compelled to eradicate slum property, that task might be taken up concurrently with the schemes of new erections.

When it was remembered that 37 per cent of the population of Edinburgh lived in houses of one and two rooms, it was plain that the housing problem of the

city would not be solved by the erection of what were really small villas in the outskirts of the city. The tenement dwellers would not go there, and could not afford to go there. Hence, an all-important part of the problem in Edinburgh was to make as speedily as possible the slum properties habitable.

He thought the Bill should also contain a clause giving Local Authorities ample power, by way of framing by-laws and otherwise, to deal with the evil of overcrowding, and especially to prevent the indefinite subdivision of tenement property. The financial proposals of the Government, moreover, were unsatisfactory, and that was doubtless a reason why Local Authorities were hesitating to prepare complete housing schemes. The promised Government subsidy was to apply only to what was accomplished in two years from February 1919. Thereafter Local Authorities were apparently to be entirely responsible for housing enterprises. That would throw too great a burden on the individual localities in reference to a reform as to which the obligation was really national.

It was to be hoped that the financial arrangements would soon be satisfactorily adjusted so as to allow complete housing schemes to be prepared and entered upon. It must never be left out of mind that the present policy as to housing was merely a stop-gap policy. Stock was to be taken of the National position at the end of seven years. Subventions and subsidies could hardly be continued indefinitely, and the only real and thorough solution of the housing question was involved in a just solution of the wages question. The

whole position would remain unsatisfactory until the worker received such a wage as would enable him to pay an economic rent for a comfortable home. The efforts of all who had the interests of the country truly at heart ought therefore to be directed to the establishment of such economic conditions as would enable adequate wages to be earned and paid.

In 1904 Drs. Robertson and Porter wrote:- The deserving artisan is by force of circumstances compelled to live in property bordering upon being a danger to health, if not actually so, because private enterprise cannot afford to erect tenements of single houses which can be let at 2/6 per week or £6.10/- a year."

(The figures given above must be altered to correspond with the enormous increase in "the cost of living" which has taken place within the last few years.)

And again, "Unfortunately many members of corporationslook at the question entirely from its monetary aspect. It will be the duty of the Medical Officer of Health to shew that public health is of far more importance than financial considerations."

The Housing and Town Planning Act of 1909 is of importance.

It is "An Act to amend the Law relating to the Housing of the Working Classes, to provide for the making of Town Planning schemes, and to make further provision with respect to the appointment and duties of County Medical Officers of Health, and to provide

for the establishment of Public Health and Housing Committees of County Councils."

Some points of importance in the New Housing and Town Planning (Scotland) Act of 1919 may be quoted:-

(a) It is the duty of Local Authorities within three months after the passing of the Act to prepare housing schemes, and to carry them out when approved, failing which the work will be done at their expense by the Local Government Board.

(b) Local Authorities are given additional powers to acquire land.

(c) Local Building regulations inconsistent with plans approved by the Board are not to apply.

(d) Changes are made in the law regarding town-planning. Previous authority to prepare or adopt schemes is no longer required.

(e) Important regulations are put forward for the improvement of housing in country districts.

(f) Houses are to have a minimum of three rooms, and the Local Authorities may pass bye-laws regulating the number of houses to the acre.

(g) An owner who attempts to re-let a house ordered to be closed is subject to a fine.

Dr Addison, lately Minister of Health said in 1919:- I intend that no housing scheme, if I can help it, shall be held up for a single day by red tape. . . . In the Housing Bill Authorities are given greater powers in regard to housing schemes in every respect, except finance. This brings me to the biggest difficulty in housing - the high cost - I am glad to be able

to tell the ratepayers of Guildford that the maximum charge on them under any approved scheme is a penny rate, but the charge to the Exchequer and to the rest of the community will be heavy".

The Guildford scheme attempts to provide 500 additional houses for its inhabitants. The first instalment of the plan provides for 83 houses on 10 acres of land built in blocks of two, three and four. The houses are to be different in design, each with a bathroom, hot and cold water supply, three or four bedrooms and good gardens. The rentals (inclusive of rates) will be 11/- to 16/6 per week. It is expected that the first forty houses will be erected in four months and the remainder in six months.

This scheme is said to be the first which has matured in the South of England.

The Director of Housing, Mr Horsburgh Campbell, recently prepared a Memorandum, dealing with the question of reconstruction of houses in the areas of the City of Edinburgh, certified by the Medical Officer of Health as "unhealthy areas."

These areas are as follows:-

(1) Cowgate and St Mary'Street ; (2) High Riggs and Lauriston ; (3) Crosscauseway; (4) India Place; (5) High Street ; (6) Canongate; (7) New Broughton; (8) Pleasance and Arthur Street ; and (9) Richmond Street and Pleasance.

Mr Horsburgh Campbell states in his report that two things are important to keep constantly before them. "The first", he says, "is that in order to earn

the State grant for this work the whole of the subjects named must be either reconstructed or demolished and the ground cleared before August 1922. The second is that the cost - estimated at about £280,000 - is of such amount that it is only by the aid of State subsidy that this work can be undertaken now. This cost is quite exclusive of the cost of re-housing, either as new buildings or as reconstruction from the existing buildings."

"A Great Saving.

He reported that he had been considering the possible greater extent to which certain of the buildings might be spared for internal reconstruction, and also the keeping going of various factories and workshops within the area. When completed, it would be found that probably not more than one family out of three or four would be re-housed in the old buildings; but even this measure of salvage was a great saving, and would expedite the supply of houses under the scheme." Mr Horsburgh Campbell advises that the premises considered capable of being spared for reconstruction should be surveyed internally, so that a correct estimate might be made of the number of houses to be got out of the total number declared "unhealthy." By this means they would ascertain how many houses were required for those families by demolitionsand clearances. The process of salvage was receiving the encouragement of the Scottish Board of Health. This salvage scheme could be carried out at about half the price of the erection of new buildings in

the suburbs, and probably at much greater convenience to the families.

Further Statement required.

Detailed plans were submitted with regard to parts of the Cowgate High Riggs, East Crosscauseway, Stockbridge, High Street, Canongate, New Broughton, Pleasance, Arthur Street, Prospect Street and Richmond Street and Place.

It is declared that the Board will not sanction any reconstruction scheme until temporary houses have been found for tenants dispossessed of their houses.

The following description of the municipal houses to be erected at Gorgie may be of interest.

MUNICIPAL HOUSES at GORGIE.

The houses, which are of three, four and five apartments, are of a most up-to-date pattern, each possessing a commodious bathroom and a scullery and a front garden. They are lit throughout by electricity. So far, the Housing and Town Planning Committee have not even ventured to discuss the question as to whom the houses should be let and what rent should be charged.

Of the 130 acres of the Gorgie estate, 25 abutting the railway are being reserved for industrial works. The present housing scheme embraces 50 acres, of which 19 are to the north of the railway siding and the remainder to the south.

The Council resolved to proceed with the northern section first, as they could not get access at the moment to the other section, which is occupied by allotment holders. They also decided to erect two-storied flatted houses on the area at a density of fourteen to the acre. It is computed that the northern section will accommodate from 240 to 250 houses.

On account of the high cost of construction at the present time, it is necessary to reduce the width of the roads, giving access to the houses to an irreducible minimum. The roads, in most cases, are thus only 30 feet in width between the garden fences, with carriage ways of 18 feet. Where abutting to the area reserved for works, however, they are 50 feet.

RECREATION GROUNDS.

RECREATION GROUNDS.

There will be fore-courts or front gardens from 15 to 20 feet, and the spacing between the fronts of the actual houses will be from 60 to 70 feet. As regards open spaces for recreation purposes and for children's playgrounds, there will be about 2¾ acres available in the enclosed ground in front of the Markets, and likewise in the rear of certain of the housing blocks, while there will be also certain ornamental spaces set out with plants and shrubs where seats will be provided.

The houses are arranged four in a block, each block being separated from the others by 12 or 15 feet. There are two houses on the ground floor and two on the first floor. Each is entered by its own door, and consists generally of three apartments:- a living room 15 feet by 12, one bedroom of 160 square feet of floor space and another bedroom of at least 100 square feet.

In some cases an attic flat will be attached to the first floor houses, thus converting them into five-roomed houses. There will also be a proportion of four-roomed houses. In each house there is a commodious scullery, ninety feet square ; a bathroom, washhand basin, and other conveniences ; and ample press accommodation.

In cases where the aspect will be to the north, the type plan has been especially prepared to meet this contingency. The principal rooms are planned to look down the garden, whereby they will get their maximum share of sunlight. In this type of plan, the first floor

houses will consist of four apartments.

NO COOKING in LIVING ROOM.

It is not proposed that cooking in the ordinary sense should be done in the living room, which is intended to partake more of the sitting-room type. It is intended that all cooking, washing, &c., should be performed in the scullery.

For this purpose, the scullery will be fitted up with a cistern of 40 gallons capacity and a hot water circulating cylinder of 15 to 20 gallons capacity in which heat is generated by a small gas boiler. By a special arrangement of the circulating pipes the housewife can restrict the heating of the water to 5 gallons or so for ordinary dish washing and other purposes, and by the movement of a handle can heat the whole contents of the cylinder for a bath as required.

In addition, it is in view to connect the circulating system to a boiler behind the fireplace in the living room so that the housewife can have the option of using either a gas or a coal fire for the hot water services.

In front of the heating unit, the washing boiler, which is gas heated, will be placed, and alongside will be the gas cooker. The architect has arranged to carry off the fumes and smell by means of metal canopies and brick flues to the outside of the buildings.

The washing-tub and sink are likewise placed in the scullery, and the Water Trust have made an important concession in this area whereby both sink and tub will be supplied direct from the main by structured taps.

A comparatively small storage cistern thus suffices for the hot water generators and flushing systems.

Sash windows of ordinary type will be used throughout the blocks, as it is considered these are more weather-proof.

SIMPLE DECORATIONS.

The houses, in the interests of constructive economy, will be plain and simple externally, and will be built of stone or harling with slated roofs.

The interiors of the rooms will be treated simply and broadly, the wood being painted various colours with solignum or other similar stain and dull varnished. A plain picture-moulding will be carried round the walls, while below the moulding the walls will be treated with a suitable tint of washable distemper. Above the moulding, including the ceiling, will be treated in pure white.

Gas piping will be laid to the bedroom fireplaces in case tenants desire to introduce gas fires. It is a moot point whether, for bedrooms, public sentiment is decided enough to prefer the gas fire to the ordinary coal fire, but at any rate the tenants will have the option.

The lighting throughout the houses will be by means of electricity. This again is a point of controversy ; it being stated by some experts that the classes likely to occupy the houses may prefer gas to electricity.

In May 1921, Sir Alfred Mond, The Minister of Health reported that on the 1st May 1921 approved tenders had been received for 176,000 houses, 16,000 houses were under signed contract, and 192,090 houses had been begun.

Altogether, including subsidy-built houses, 6000 were completed by April, and building was going on at the rate of 7000 per month.

There was a nett loss to the State of about £60 per year per house on houses erected by Local Authorities under the present housing scheme for 200,000 or 300,000 houses. That meant an annual charge on the taxpayers of between £12,000,000 and £18,000,000.

The Minister of Health said that he was happy to see that the cost of building was coming down, and that a house which cost £950 in August 1920, could be built for £850 in March 1921.

(For conditions as to subsidy, the Government pamphlet issued in August 1920, may be consulted.)

Mr H. R. Aldridge, the Secretary of the National Housing and Town Planning Council, in an interview with a Press Association representative respecting the declaration concerning housing policy made by Sir Alfred Mond in the House of Commons, said that all who really knew the conditions of housing in England and Wales agreed that the number of houses - 300,000 - as the limit at present contemplated was inadequate, and would leave the problem of the housing shortage unsolved.

Mr Aldridge added that the attitude of the Government concerning their commitments under the Housing Schemes of Local Authorities was the most interesting, and it was now recognised that a battle had been proceeding between the advisers of the Treasury and the Ministry of Health. Only in that way was it possible to reconcile the statement made by Sir Alfred Mond to the effect that his predecessor and the late Chancellor of the Exchequer had agreed to accept the number of 300,000 houses as a kind of limit of commitment to housing schemes in England and Wales (as distinct from Scotland), whilst the housing survey made under the conditions laid down by the Ministry of Health revealed the need for not far short of a million houses.

Mr Aldridge said that the building of 100,000 houses was necessary in order to cleanse those towns and villages which had "sprawled" up around collieries, of the insanitary hovels which disgraced them, and the Local Authorities for the mining areas (whose housing schemes actually comprised this number) would certainly not consent to their schemes being cut down.

What was true of mining districts was true of practically all the great industrial areas in the kingdom. The members of the Housing Committees for these areas were often sick at heart in considering the records of housing needs which came before them. One such record was that of a woman who, ten days ago,

left a miserable temporary shack on the mountainside at Pontypool to throw herself and her baby into a pond because she was tired to death of the struggle for life in wretched surroundings.

Every Local Authority with a housing scheme in the London area had a long waiting list of applicants. On the list of the Croydon Town Council there were 2000 names.

Before the war the three great parties in the House of Commons published estimates of rural housing needs, showing that at least 120,000 houses were needed to put rural England right. Since these estimates were published conditions had become steadily worse.

Mr Aldridge, commenting on the small size of the rooms, said, that, as a homely but practical example, it could be stated that in some of the hill districts of Lancashire there were weeks on end during which it was not possible to dry clothes in the open air. In these districts all houses - large or small - had in the lofty living room or kitchen a simple appliance of pulleys and ropes fitted up, by means of which the weekly wash could be hauled up to dry just below the ceiling level.

The pressure of local feeling had been so great in such areas that it had been necessary to give way and to permit heights in rooms of 8 feet 6 inches and 9 feet.

Referring to the expenditure on housing, Mr Aldridge said that the £12,000,000 to £18,000,000 per

year, of which the Minister of Health spoke, was a mere bagatelle compared with the expenditure of £600,000,000 expended on the luxury of alcoholic refreshment. "The country", he concluded, "which can afford this luxury expenditure can afford to have its people decently housed."

Mr Aldridge's remarks regarding the cost of alcoholic refreshments lead us to the consideration of Alcoholism and its Relation to Tuberculosis.

Alcoholism in relation to Tuberculosis.

The influence of alcohol as a predisposing cause of Tuberculosis has been recognised for some years.

To quote Sims Woodhead "Alcohol, so far from being a valuable drug in the treatment of tuberculosis disease, as was at one time supposed, is now looked upon as one of the great predisposing factors in the production of both acute and chronic pulmonary tuberculosis, and it is generally accepted that in alcoholic patients tuberculosis is far more likely to assume an acute and generalized form than it is in the non-alcoholic patient, for, as Dr Dickinson said, "We may conclude, and that confidently, that alcohol promotes tubercle, not because it begets the bacilli, but because it impairs the tissues and makes them ready to yield to the attack of the parasites."

In France, in the districts in which the greatest amounts of alcohol are consumed, the highest mortality from tuberculosis is met with, alcohol apparently acting as a devitalizing agent and rendering the person indulging in it to excess a more easy prey to infection. Baudon in 1901 showed that a consumption of alcohol of 12.5 litres per person, corresponded to a mortality from tuberculosis of 32.8 per 1000 living, whilst the consumption of 35.4 litres of alcohol per person corresponded to a death-rate from tuberculosis of 107.8 per 1000".

(A /

(A recent letter to the Temps, addressed by M. Henri Schmidt, Deputy for the Vosges, and President of the new militant temperance society, known as L'Alarme, is of interest.

According to M. Schmidt, in Western France, where the consumption of alcohol is large, the proportion of deaths due to tuberculosis is 2.61 per 1000 - the lowest figure in the most sober district being 1.95 per 1000.

The maximum number of deaths from tuberculosis, 4.54 per 1000, is attained by the area round Paris, where the influence of alcohol is joined to that of bad housing and exhausting conditions of life. Tuberculosis tends to increase in the country, particularly in the districts where the right of private distilling exists.)

" The manifold relations of tuberculosis to alcoholism are only now coming to be understood, but it has been recognised for some time that the death-rate from phthisis (pulmonary tuberculosis) is disproportionately large among those engaged in occupations in which there is an exceptional amount of alcoholic indulgence."

Here, however, as Dr Newoholme points out, the relationship is dual. On the one hand, alcoholic indulgence has a marked action in lowering resistance to infection by the tubercle bacillus, whilst, on the other, the intemperate, frequenting public-houses, expose themselves in a marked degree to the risk of massive infection from the tubercle bacilli

known only with the expectoration of tuberculous alcoholics, who are not only more infected, but are also more careless. During the War Sims Woodhead also wrote: "The money spent in drink, an expenditure that has risen by a million a month for the last eight months, in spite of the calls to thrift and economy that are being made by all responsible people, would provide housing, clothing and food for the hundreds of thousands of men, women and children who at present are below the 'Plimsoll line' of safety and comfort, and who never have the chance of living under healthy physiological conditions. They are, in fact, never healthy ; their whole life is pathological. Disease is their constant companion, and death their ever active pursuer". And again, "Alcohol lowers vitality, impairs judgment, sterilizes initiative, absorbs wealth, vitiates morality, and in raising the morbidity rate, increases the death-rate. The national conscience has not yet been thoroughly aroused to the importance of the issues at stake, that in peace or in war intemperance is the link in the chain of our national life, which gives the greatest evidence of weakness and most cause for anxiety to those whose finger is on the pulse of a great, but in this matter obstinate - perhaps because proud - people."

Although I shall discuss later the question of poverty as a factor in the production of tuberculosis, it is convenient now to quote the words of the Secretary of the London Charity Organisation Society (Rev J.C. Pringle).

"Poverty in every sense in which the word can be used is produced on a terrible scale by alcoholism. The most recent presentations of the fact are as convincing and dumbfounding as were those of fifty and for the matter of that, 500 and 5000 years ago..... It is only environment that we can ever hope to change by political action, and therefore environment must bear the blame for all that is amiss in the lives of the people.

Alcoholism has got to be a mere symptom and by-product of causes which politicians can remove."

Legislation regarding the trade in alcohol.

The Rt. Honourable Sir Thomas Whittaker says:- "The legislative aspect of the temperance problem has for nearly half a century provided one of the most troublesome, difficult, and from a party point of view, dangerous social and political questions with which statesmen and Parliament have been called upon to deal" - and further,

"The financial interests involved in the liquor trade, and the political and local influences which they have been able to exert, have, for a very long time, been a serious obstacle in the way of effective legislative reform, and administrative action. During the last thirty years that influence has become more widespread, more efficiently organised, and has been more openly exercised than was formerly the case. The way in which the various branches of the liquor and allied trades have been able to concentrate their political power, and having it to bear locally and

nationally, and the extent to which they have been willing to subordinate every other consideration of public interest and well-being in order to resist any and every effort to restrict the sale of drink, has led a large and influential body of thoughtful social reformers to the conclusion that effective dealing with the legislative and administrative phases of the drink problem would be enormously facilitated if the financial interest of those who are engaged in the liquor trade were reduced to a minimum."

The secretary of the National Temperance League (in alliterative mood) says:- "Nothing short of a steady, co-ordinated endeavour by the various agencies promoting public health, social welfare, and temperance, will produce the desiderated dynamic to awaken an interest in themselves on the part of the new democracy which is slowly evolving from a servile state, due in great measure to ignorance and apathy, dependent on alcoholic narcosis.

There must be a closer association between educational temperance organisation, and those operating in matters of sanitation and public health, and the public poster and the brief booklet, with the simple statement in the printed paragraph, should be exhibited and circulated under these joint auspices, and in co-operation with the National Insurance and Municipal Health Committee.

Authoritative opinion from the Medical profession is still needed to supply the material for such suggested propaganda. There is also a call for increased research regarding numerous disputable points."

The recent heavy defeat of the "No Licence" party in Scotland leads one to believe, that at the present time, education of the public as regards the advantages of national sobriety will ultimately prove to be more successful in the suppression of alcoholism than any attempt to enforce temperance by legislative measures. Of the results of Prohibition in America, I am not qualified to speak.

Finally, in the words of Kelynack "The whole problem is intricate and involved, but the highest interests of the nation are concerned, and in spite of all prejudices and every form of predilection, searching study must be directed to its solution.

Of this we must at all events rest fully assured, that no measures can be expected to attain any permanent advantage in penetrating, ameliorating, or arresting the drink curse, unless they are firmly based on scientific principles."

Poverty in relation to Tuberculosis.

The question of housing has already been discussed. While alcoholism may lead to poverty, the poor may seek an artificial happiness by unwise expenditure on drink, and thus a vicious circle may be established. The problem of poverty is such an important one that it cannot be discussed here at length.

It may be pointed out, however, that apart from alcoholism, poverty produces malnutrition, due either to insufficient or unsuitable food. In addition, the poor are often miserably clad, and thus

rendered less fit to resist disease.

The question of nutrition in relation to the prevention of tuberculosis is a very important one.

Hutchison says, "The tubercle bacillus seems to find a peculiarly favourable soil in ill-nourished persons. The association between bad feeding and such diseases as phthisis and scrofula is well established..... There is reason to fear, however, that large sections of the community in this country are still habitually underfed. Observations on the diet of labourers in Edinburgh showed that it contained an average only 107.7 grammes of protein, as against Atwater's standard of 125 grammes, and an energy value of only 3228 Calories, as opposed to the 3500 which he believed to be necessary for a labouring man. Mr Seebohm Rowntree's enquiries into the diet of a corresponding class in York yielded similar results, the energy value being 17 per cent. and the protein average no less than 29% below standard requirements. There is urgent need for more extended studies on similar lines to these. Meanwhile it may be pointed out that the defects above indicated are due not so much to poverty as to ignorance; not to buying too little food, but to buying the wrong articles. The Edinburgh investigations were of opinion that in order to improve the dietary of the labouring classes, the following principles should be instilled into them :-

1. That a diet of tea and bread, or of tea, bread and butter (the lazy diet) is faulty.

2. That the faults of the tea and bread diet can be corrected by the full one of meat, eggs, or other animal food, but that this method of correction is expensive.

3. That the faults can be corrected by the full use of oatmeal with milk, or of peas or beans, without extra cost.

The bad effects of underfeeding fall most heavily upon the young, for the greater the demand on the part of the body for food the more severely is any deficiency felt."

Hutchison also says, "Not only, I think, does a diet rich in protein make for physical and mental energy ; it seems to increase also one's power of resisting disease.

An abundant supply of protein seems to be necessary if the blood and muscles are to be kept in good condition, and by promoting oxidation it increases vigour and diminishes the tendency to an undue accumulation of fat. The nervous system, too, seems to require a plentiful supply of protein if those mysterious influences which emanate from the brain and spinal marrow are to be maintained with sufficient potency to enable the tissues to ward off the inroads of disease.

To growing children a deficiency of protein in the diet is specially disastrous, for the lack of building material which it entails may result in impaired growth and development, the consequence of which may last throughout life."

Animal protein, is of course expensive whether in the form of meat or fish.

Hutchison points out that for a given sum one gets about four times as much vegetable as animal protein.

Before the War, a Glasgow observer pointed out that

the minimum wage on which a working class family could maintain a good standard of health was £1 per week. Owing to present economic conditions, the figure must be multiplied by the necessary factor in order to make it applicable to present-day prices.

Chalmers Watson says, "Not a little of the malnutrition seen in the children of the poorer classes at the present time is due to ignorance rather than to actual poverty."

This is very clearly brought out by the recently issued report for 1910 of Sir George Newman, Chief Medical Officer of the Board of Education..... it discloses..... the fact that a considerable percentage of children are also suffering from a greater or less degree of malnutrition. The report leads to the conclusion that it is too widely diffused to be attributable to poverty in more than a small proportion of cases ; a more probable explanation seems that afforded by the extraordinary ignorance of English women of the industrial classes concerning food values cooking, and general economy of dietetics.....

Further, additional interest and importance now attaches to the subject of cheap and nutritious foods in view of the Provision of Meals Act, 1906, which empowers educational authorities to supply school children with meals, the cost of which is met out of the rates..... It may be laid down that the essentials to be considered are the following:-

1. The food must be nourishing and ample in amount.

2. The food must be as cheap as possible consistent with 1.

3. The food must be of a nature that it can be readily cooked with the limited facilities available in a one or two-roomed house.

4. In children, satisfactory rate of growth, increasd vigour, and more efficient education must result.

The most useful cheap and nutritious foods may be tabulated as follows:-

Proteins	Fats	Carbohydrates.
Peas	Margarine	Bread and Bread foods
Lentils	Cheese(cheaper varieties)	Potatoes
Beans		Jam
Oatmeal		Treacle
Macaroni		
Meat (cheap cuts)		
Liver		
Skimmed Milk		
Herring, Ling, haddock.		

.... An illustrative cheap system of dietaries is here given:-

Breakfast :-
Porridge and skimmed milk.

Dinner : Selected from the following:-
Soups from (1) Peas, beans or lentils.
(2) Sheep's head flavoured with rice, or barley, or vegetable.
(3) Fish soup, made from cod's head or trimmings.

Meat course selected from:-
(1) Liver, tripe, neck of foreign meat, mince made up with bread crumbs and potatoes.
(2) Fish, either haddock fried in batter, haggis with potato, ling or John Dory fried in batter or made into fish-and-potato pie.

(3) Bread with skimmed milk, margarine or dripping toast, cheap skimmed milk cheese.

Supper Selected from
Bread and butter, or porridge and skimmed milk....

An excellent series of two-course dinners was worked out in detail by Dr Ralph Crowley in con-

conjunction with Miss Marion Cuff for the City of Bradford Education Committee. This report gave details of seventeen suggested two-course dinners, of which about one-half contain meat, adapted for a family of seven, - father and mother and five children of average age of ten years - the cost of food material (in 1907) ranging from 1.1d. to 2½d. per head. The average food value of these dinners in protein and fat is as follows:-

Protein	Fat
29 grams.	18 grams.

Before leaving the subject of nutritive and economical two-course dinners, a word of caution should be added. When a two course dinner consisting of soup and pudding is relied on as an ample meal, especially for children, care must be taken that the proper amount of nourishing food is given in each course.

The author recently analyzed three two-course dinners which were supposed to be planned on the Bradford system (protein, 29 grams; fat,18 grams); analysis showed that the nutritive value of the meals was low, the composition of the meals being as follows:-

Proteins	Fats
20.6 grams.	1.8

The deficiency was accounted for by the soup being too thin, the puddings also being deficient in nutritive value."

Hutchison says, "One can understand the enormous importance of establishing good digestive habits in the young.

If a child is encouraged to avoid fat, forexample, he may ultimately lose the power of producing the secretion specially suited to the digestion of fatty foods, and may then, with the best intentions, be unable to eat much fat all his life afterwards, and so suffer from impaired nutrition. This is the more to be regretted, as there is reason to believe that inability to digest fat renders one peculiarly liable to become the victim of tuberculous disease." When I was a school Medical Officer in Perthshire, we had a "Malnutrition card." No doubt such a card is in use in other districts.

On the one side of the card a simple definition of what is meant by malnutrition is given, and on the reverse side advice as to feeding and hygiene. The child takes the card home in the usual way to parent or guardian. In one case of mine tuberculosis was discovered by the family doctor, and on Sir Robert Philip's advice the child was sent to Grantown-on-Spey, with beneficial results.

As tuberculosis is notoriously difficult of diagnosis in children,and as in school medical inspection time is limited, the "malnutrition card" serves a useful purpose.

Chalmers Watson worked out the following one-course dinners for the Edinburgh School Board some years ago :-

		Grams of Protein	Fat	Carbohydrate.
1.	Lentil Soup	29.5	3.7	112.6
2.	Meat soup & potatoes	18.5	9.4	67.2
3.	Plum Pudding	36.4	20.2	151.4
4.	Scotch Broth	28.2	8.1	71.0
5.	Porridge & hard biscuit	24.5	4.1	105.3
	Average	27.1	9.0	102

The average cost of such dinners per head in pre-war days was 1.2 of one penny.

Regarding these one-course dinners Chalmers Watson says:-

"No. 1. is a very nourishing dinner, obtained at small cost.

No. 2. is of considerably lower nutritive value and is out of proportion expensive.

No. 3. is a rich, highly nourishing meal and is proportionately dear ; it is only advisable as an occasional meal.

No. 4. is a good dinner, obtained at moderate cost.

No. 5. is also a good meal, a little below the average in nutritive value; this can be rectified by slightly increasing the amount of milk."

As regards the feeding of children younger than those of school age, the cost of milk is a serious obstacle. Now that child welfare centres have been established, the issue of milk tickets may do much to counteract the habit of excess in carbohydrate feeding.

In the words of Hutchison" Even for some time after weaning, cows milk should still be the chief source of protein. It may be supplemented at the end of the first year by small quantities of yolk of egg, and chicken, fish, and a little underdone meat

may gradually be added. These animal substances are the best sources of protein, because they contain it in a concentrated and easily digested form. It is possible, however, to rear healthy children on a diet, the protein part of which is almost entirely derived from vegetable sources, especially if the child is able to lead an active and out-of-door life... In most cases, however, it is safer to supply at least one third of the total protein required in an animal form...

Fat should be derived from such sources as good milk, butter, the yolk of egg and bacon. Difficulty is often found in getting the child to take enough fat, but its importance in the diet is such that pains should be taken to educate the child in this respect. By giving it in a state of fine division, the difficulty may often be overcome. Thus, butter spread on bread or mixed with mashed potatoes may be taken when more solid fat would disagree or be refused. Suet pudding also contains fat in an easily digested form.

If any carboyhdrate be added to the diet at all before the teeth are cut, it should, as we have seen, be in a soluble form.,..... Even up to the end of the first year it is well to avoid purely starchy foods, unless in very limited amounts..... After the first year more solid starchy food may be given : Rice, potato and oat flour are the most easily digested forms..

Sugar is one of the most important forms in which carbohydrate can be added to the diet of

children..

Jam is an important article for adding carbohydrate to the dietary. The claims of jam versus butter have already been considered ; but I would only point out here that so great is the importance of fat in the diet of childhood, and so few the forms in which it can be given, when compared with the abundant choice of different varieties of carbohydrate, that one must on no account allow jam to replace butter, or even dripping, as the habitual accompaniment of the child's bread.

The mineral matters which are so important for building up the bones, muscles and blood of the forming child, should be chiefly derived during the first two years at least, from milk. Abundance of milk in the diet will ensure a sufficient supply of the three most important ingredients - lime, potash, and phosphoric acid. Those are contained in yolk of egg, the red meats, and in such vegetable substance as oatmeal.

The vegetable salts of potash which occur so abundantly in fruits and green vegetable, are also of importance, and such articles should always find a place in the child's menu."

Debilitating conditions such as venereal disease are predisposing causes of tuberculosis.

The organised campaign against venereal disease will no doubt in time raise the general standard of health of the population. Care during convalescence from measles, whooping cough and influenza is of great importance.

Fatigue and overstrain are potent predisposing causes of tuberculosis. This point has been emphasised during the War, although "gassing" seems also to have been a common history in some cases. It is also interesting to note that"over-athleticism" has its dangers. This is of importance in a sport-loving country such as our own. Such severe exercise as competitive rowing is not free from danger.

Reasonable working hours are now generally the rule in many trades, but the hours of some sedentary workers are still very long. From a hygienic point of view, "overtime" is undesirable where the occupancy is indoors.

In Sir Robert Philip's words, "From infancy onwards the citizen must be bred in an environment which makes for resistance. The great practical difficulty lies in the ignorance and helplessness of the average individual and household in respect of airm cleanliness and food.

Effective resistance will follow in proportion as the vitalizing properties of fresh air and cleanliness are understood and demanded in the ordinary household, and the child's compulsory environment is maintained in accordance with physiological principles

which make for health.

Those principles are simple and broad, and their application is easy and costs little.

There is urgent need for education in the laws of health. From childhood onwards men and women must be trained to "know themselves." Beginning with the simplest possible facts, they should be made to understand the machinery of the human body, and the fundamental principles of health. In this direction much might be achieved by doctors, nurses, health visitors and social workers.

Were the cardinal principles of the sanatorium realised within the house and workshop and in communal life generally, the influence of the tubercle bacillus might largely be discounted.

Every school should be an object lesson in health methods, and first and foremost of such object lessons should be the constantly open window. Every school should be an open-air-school. School teachers must realize for themselves, and so be able sympathetically to impress on their scholars the paramount significance of oxygen in healthy life.

There must be practical training in domestic economy - object lessons in the selection of preparation of food and clothing, choosing of the dwelling, washing, lighting, in the ready detection of departures from health, and in the general principles of nursing.

The main facts regarding the occurrence and propagation of tuberculosis should be common knowledge. Everyone should understand that tuberculosis is not got by exposure to cold, that otherwise, the

the more freely the individual enjoys fresh air and sunlight, the more certainly will he avoid tuberculosis.

Dusting and sweeping rooms and offices ought to be carried out by moist methods, and, when possible, immediately after, rather than before, occupation.

In choosing a house, its potential of air and sunlight should be the first consideration.

Dryness of the residence is essential. Every effort must be made to lead the physiological life. Etiological facts all go to shew that the more the individual is in the open air, the less is he likely to contract tuberculosis. Contrariwise the more he is indoors the greater is the risk. The risk must be minimized as far as possible, for those whose business is chiefly sedentary by the direct admission of fresh air during working hours, and by an extra allowance of fresh air at other times, especially by night. The sedentary habit must be counterbalanced by activity in the open in off times. Respiratory movements and posterial (postural?) exercises - in a word, lung gymnastics - should be practised regularly either in the open-air, or, when this is impossible, in a room with the window freely open.

Life from day to day should be regular and simple. The toilet of the skin (baths, rubbing etc.) should be carefully attended to. Clothing while sufficiently warm, should be light, and all constriction excluded. Chest protectors and extra mufflers should be taboo. The use of stimulants and tobacco, if indulged in, should be carefully regulated, and

cigarette smoking should be excluded."

And again, "the inspection of lodging-houses, workshops, factories, places of assembly and public conveyances should be more stringent.

Cleanliness of streets must be insisted on, and street-cleaning should be rendered harmless by watering the streets previously to brushing them. Spitting on the streets and in assembly places and public conveyances should be forbidden as a nuisance."

Child welfare schemes and school medical inspection play their part in raising the general standard of health in youth. The educational value of this so-called "grandmotherly legislation" should not be forgotten.

From what has been said it is seen that indirect measures in the prevention of tuberculosis are very important. Before passing on to (2), the direct methods of prevention, I shall give some statistics regarding tuberculosis for the year 1920.

The figures are those quoted by Sir Robert Philip from the official records.

TABLE /

TABLE i.

Total deaths, and death rate per 100,000 population from tuberculosis 1920:-

England. †

	Total No.of deaths	Death rate per 100,000
Tuberculosis (all forms	42,545	113
Pulmonary Tuberculosis	33,469	89
Tuberculous Meningitis	3,585	10
Abdominal Tuberculosis	2,182	6

† These totals include the following deaths of non-civilians.

Tuberculosis (all forms)	240
Pulmonary Tuberculosis	201
Tuberculous Meningitis	5
Abdominal Tuberculosis	7

Scotland.

	Total No.of deaths	Death-rate per 100,000
Tuberculosis (all forms)	6,042	124
Pulmonary Tuberculosis	4,194	86
Tuberculous Meningitis	590	12
Abdominal Tuberculosis	525	11

Ireland.

	Total No.of Deaths	Death-rate per 100,000
Tuberculosis (all forms)	7,651	171
Pulmonary Tuberculosis	5,911	132
Tuberculous Meningitis	487	11
Abdominal Tuberculosis	481	11

TABLE II. /

TABLE II.

Larger cities of Great Britain and Ireland 1920:

Death rate per 100,000 population from Tuberculosis.

(In English towns the rates refer to civilian population only.)

	Estimated Population	All Tuberculosis	Pulmonary Tuberculosis	Tuberculous Meningitis	Abdominal and Other Tuberculos
London	5,531,971	127	106	10	10
Glasgow	1,098,568	149	106	15	27
Birmingham	895,915	113	95	6	12
Liverpool	803,452	173	141	13	19
Manchester	770,597	143	117	10	16
Sheffield	492,570	118	93	10	15
Leeds	448,913[1]	158	125	14	19
Dublin Area	415,000	238	178	-	60
Belfast County Borough	413,000	237	185	-	52
Bristol	375,641	122	99	10	13
Edinburgh	334,942	124	85	11	28
Bradford	293,979	111	92	7	12
Newcastle-on-Tyne	286,061	175	133	18	24
Dundee	184,084	137	99	11	26
Aberdeen	164,907	129	93	11	25

[1] The County Borough of Leeds was extended on April 1st. 1920, and the population shewn in this Table is an adjusted Population, i.e., weighted so as to be comparable with the deaths as registered throughout the year.

TABLE III. /

TABLE III.

Death rate per 100,000 of population, male and female, in Scotland collectively in burghs and districts thereof, 1920 from various forms of Tuberculosis:-

	Estimated Population	All Tuberculosis	Pulmonary Tuberculosis	Tuberculous Meningitis	Abdominal Tuberculosis	Other Tuberculosis
		Death rate per 100,000 from				
Scotland	4,864,393	124	86	12	11	15
Males	2,317,538	134	92	13	10	18
Females	2,546,858	116	81	11	11	13
rger Burghs	2,385,331	141	88	14	12	17
aller "	960,671	115	78	11	10	16
untry Districts	1,518,394	104	73	10	10	12

TABLE IV.

Death rate per 100,000 of population in each age-group in England and Wales in 1920 from Pulmonary Tuberculosis, Tuberculous Meningitis, Abdominal Tuberculosis, and other tuberculous Diseases:-

	All Ages	AGE. 1	1	5	10	15	45	55	65	75 & over
Pulmonary Tuberculosis	89	25	22	12	26	120	135	107	73	31
Tuberculous Meningitis	10	74	49	18	11	3	1	1	-	-
Abdominal Tuberculosis	6	43	22	6	5	4	3	2	2	1
Other Tuberculosis	8	21	13	7	7	8	8	10	13	12

TABLE Iv.

Death rate per 100,000 of population in each age group in England and Wales in 1920 from Pulmonary Tuberculosis, tuberculous meningitis, abdominal tuberculosis, and other tuberculous diseases.

	All ages	-1	1-	5-	10	15	45	55	65	75 & over
Pulmonary Tuberculosis	89	25	22	12	26	120	135	107	73	31
Tuberculous Meningitis	10	74	49	18	11	3	1	1	-	-
Abdominal Tuberculosis	6	43	22	6	5	4	3	2	2	1
Other Tuberculosis	8	21	13	7	7	8	8	10	13	12

As above / Scotland

TABLE V.

AGE.

	All Ages	-1	1-	5-	10-	15-	25-	35-	45-	55	65	75 &
Pulmonary Tuberculosis	86	16	18	15	28	113	129	133	138	102	62	32
Tuberculous Meningitis	12	132	50	19	12	5	2	1	1	-	-	-
Abdominal Tuberculosis	11	61	34	14	10	8	5	4	5	6	3	1
Other Tuberculous Disease	15	46	21	12	12	16	12	12	13	18	11	16

As above / Ireland

TABLE VI.

	All Ages	ǂ-1	1-	5-	10	15	25	35	45	55	65	45 & over
Pulmonary Tuberculosis	132	ǂ23	26	26	61	200	215	197	168	114	45	19
Tuberculous Meningitis	11	ǂ55	32	22	21	10	5	3	-	-	-	-
Abdominal Tuberculosis	11	ǂ40	33	13	9	9	11	7	6	5	2	1
Other Tuberculous Diseases	17	ǂ41	23	8	15	21	15	16	21	20	10	10

ǂ The rates for deaths under one year are per 100,000 births registered.

With /

With reference to these tables, Sir Robert Philip says:- "Fortunately the mortality records, if still appalling, shew a progressively favourable tendency. This is brought out by a comparison of the Registrar General's figures for 1890 and 1920 an interval of thirty years. From pulmonary tuberculosis alone in 1890 the death rate in England was 168 per 100,000, whilst in 1920 it was 89 per 100,000.

From the same cause, in Scotland in 1890 the death-rate was 193 per 100,000, whilst in 1920 it was 86 per 100,000.

The comparison shews that by some means or other, a successful resistance is now being offered to tuberculosis invasion which was not offered before.

This is the more significant as it may be safely assumed that, with increasing exactitude of diagnosis, the actual proportion of deaths properly registered has increased...

The progressive decline is noteworthy.A hasty glance at the figures might suggest that the decline has been continuous and equal from decade to decade. A fuller examination shews that this is not so.

The fall has latterly been considerably accelerated. Thus, in Scotland, taking twenty years up tp 1890, the <u>percentage fall</u> in mortality from all forms was 35, while during the twenty years from 1900-1919, the <u>percentage fall</u> was 45.

In addition to the accelerating fall in the death-rate, it is noteworthy that the age at death is gradually being postponed.

That the remarkable fall is not due to natural causes which influence all civilized counties in more or less similar fashion, is seen by comparing the figures for England and Scotland with the corresponding figures for Ireland, France and Germany.

In 1915, for pulmonary tuberculosis, the figures per 100,000 of the population ran as follows:- Scotland, iii ; England, 116 ; Germany, 142 ; Ireland, 172 ; France, 179.

Such facts raise questions as to the view maintained by Metchnikoff and others that a process of gradual immunization is in progress in thickly populated countries through national vaccination. With the figures before us, we are faced with the query:- If some countries are thus reaping the benefit of prolonged natural vaccination, why are there such striking differences in the various groups forming the older civilizations ? If natural immunization be the reason, why the difference in favour of Scotland over Ireland and France ? If natural immunization be the reason, why should Scotland and England show the strikingly low mortality (111 and 116 respectively, as compared with France (179) ?"

Sir Robert Philip points out that a minimal basis for assessing the incidence of tuberculosis requiring immediate attention in any district is found by multiplying the recorded mortality from tuberculosis by 20.

He also points out that at least 30% of different

groups of Edinburgh School children examined by him presented definite evidence of tuberculosis, and, further, that a sluggish, undemonstrative type of pulmonary tuberculosis may occur in the grandparents and other elderly relatives of a household. He says, "These old people must unhappily be regarded as carriers of the disease to children in the household and to others with whom they may be in frequent close contact".

Cure of Pulmonary Tuberculosis:-

As the cure of Pulmonary Tuberculosis is one of the means of prevention of the spread of the disease from sick to sound, it is necessary to discuss the outlook as regards recovery.

Walters says :- "If we look at Pulmonary Tubercle from the public health point of view, the most important thing is to prevent infection from spreading from well marked cases who are expectorating tubercle bacilli ; but from a curative aspect, the most important thing is to recognize and adequately treat (sic) the disease before this stage has been arrived at."

The cure of Pulmonary Tuberculosis depends largely, if not entirely, upon early diagnosis.

The patient is often his own worst enemy. For various reasons he may go about feeling, it may be, "a little seedy", "easily tired", perhaps a little breathless.

There is no need to multiply instances. Pos-

Possibly on the advice of friends or relatives, the patient may seek medical advice. The disease may have gained a considerable hold by this time. On the other hand, it may be so slight as only to be recognised by the skilled worker in tuberculosis. Too often, alas! the diagnosis is "missed," with unhappy results.

Now that more attention is being paid to special training in tuberculosis, it is to be hoped that every general practitioner will be to some extent a specialist in the recognition of the disease in its pulmonary form.

To quote Walker's again : "It is of great importance to recognise an attack of tubercle in the earliest possible stage. Hippocrates who died about 380 B.C., taught that phthisis, if treated early enough, got cured, and many other since his time have been convinced of the same fact. Discovered early and suitably treated, tubercle of the lungs usually ends in recovery, while if neglected it is far more dangerous to life, requires many more months of treatment, and usually leaves behind it more or less permanent damage to the lungs, and consequently the general vigour and working capacity. Moreover, while there is no possibility of transmitting the disease to others in the earliest stage. this is very likely to happen when the disease is only discovered after there has been free expectoration for some time.

The popular conception of the nature and symptoms

is entirely based upon the character of the disease in an advanced stage, and even medical men are found to countenance a haphazard treatment in the early stages, on the plea that the patient is not ill enough to require sanatorium treatment or any substitute for it worthy of the name. And yet it is during the earliest stages, before any tubercle bacilli have appeared in the expectoration, and when the patient is merely "run down", or suffering from "debility" or "congestion of the lungs", or some other vague ailment, that the results of systematic treatment are likely to be the most brilliant and recovery to be the most complete".

" So long as the change in the lungs is confined to a few scattered tubercles, and the constitution is as yet not undermined, there is no reason why we should not see a recovery so complete that the patient will enjoy as good or better health than before his illness, and will be indistinguishable from his unattacked companions save by his horror of close rooms, and his dislike of coddling ways. . . . . Treatment in an early stage, then, will often restore the man to full working capacity ; but in a late stage, if he recovers, he will often be an invalid for the rest of his life, unable to bear his part in the work of the world. When the recovery is incomplete, much will depend on the conditions of life after apparent recovery ; so that the man who can study his health and his needs may live for many years, but the man who is compelled by lack of means to live an unhealthy

life, or whose occupation or place of residence is unsuitable, will be continually in danger of a fresh break-down. . . . . Careful examination of the chest is a most important help in the discovery of early tubercle. . . . In really early disease, there should be no well-marked alterations discoverable in the lungs, so that careful attention to the clinical history and the use of the thermometer, the opsonic test, or the tuberculin test, are of more importance at first than even the examination of the chest.

Since tubercle attacks other parts of the body besides the chest, examination of the eye, the larynx, the lymphatic glands, etc., may help to establish the diagnosis. Loss of voice or slight hoarseness is very common as a forerunner of tuberculosis. Tuberculosis is no exception to the rule that in Medical matters every part of the body and every physiological system should be passed in review in examining a doubtful case of disease."

As regards clinical classification, an extremely useful method was introduced some years ago by Sir Robert Philip, who writes as follows:-

"The following classification gives approximately fresh expression both to the amount of anatomical involvement and to the systematic disturbance. It groups cases more satisfactorily from the clinical standpoint, and affords valuable indications as to prognosis and treatment.

The symbol L represents the local, or, in

the case of Pulmonary Tuberculosis, the lung lesion, and the symbol S the systematic disturbance. For convenience the three anatomical stages, already referred to,† are accepted and described as L_1, L_2, L_3. (†Turban-Gerhardt classification)

By the simple device of combining variously capital and small letters, the diagnosis at a given time can be expressed with reasonable accuracy. Thus, in cases with a limited involvement of the lung, the various possibilities may be stated as L_1, - a slight local process without systemic disturbance; or L_{1s} - a slight local process with relatively slight systemic disturbance; or $L_1 S$ - a slight local process with equivalent systemic disturbance; or $l_1 S$ - a slight local process with excessive systemic disturbances. It matters not what amount of local lung involvement exists, whether L_1, or L_2, or L_3, the same principle of classification is available.

Practical experience has shewn the value of such a scheme. It has not merely a value in relation to diagnosis at a given moment, but affords a most serviceable means of recording the changes which occur from time to time in such cases, whether in the direction of improvement or the reverse.

The following table shews the scheme of classification and the symbols in use:-

L_1	L_{1s}	$L_1 S$	$l_1 S$
L_2	L_{2s}	$L_2 S$	$l_2 S$
L_3	L_{3s}	$L_3 S$	$l_3 S$

The presence of complications is indicated by the given symbol followed by a reference to the lesion, e.g., $T_3 S$ + ent. tb indicates a case of extensive lung involvement (vomica formation) and excessive systemic intoxication, along with intestinal cuberculosis."

Early diagnosis: The early diagnosis of pulmonary tuberculosis is not always easy even when the observer is a trained clinician. In addition to ordinary clinical methods help may be afforded by the use of one or other of the tuberculin tests.

For these tests old tuberculin is used.

The more common tests are:-

1. The ophthalmic reaction introduced by Calmette. This test is rather dangerous. A one per cent saline solution of tuberculin is employed.

2. The Von Pirquet cutaneous reaction. Negative results are of value in excluding a tuberculous infection, but a positive result is said to be a doubtful indication of active tuberculosis.

3. Moro's test in which an ointment containing 5cc of old tuberculin with 5 grm. anhydrous lanolin is applied to the skin of the abdomen. This method has the advantage of preserving an unbroken skin surface. The laity may sometimes object to the sacrification of the skin which forms part of the Von Pirquet method. By the Moro and Calmette tests a positive result is shewn by inflammatory reaction in twenty-four hours, while the time required by the Von Pirquet tests may be as long as forty-eight hours.

X-rays (in the hands of a skilled observer) may be useful.

Any sputum available should be examined for the presence of the tubercle bacillus, discovery of which is, of course, confirmatory evidence of the disease.

It was demonstrated eleven years ago by Roger and Levi-Valensi that absence of albumin from the sputum excluded tuberculosis. A positive albumin reaction may mean other diseases besides tuberculosis, but as bronchitis and bronchial asthma are not characterized by albumin in the sputum the reaction serves to show whether the disease is located in the lungs or the bronchi. A.C.Alport has applied the albumin test to the sputa of a number of patients, and has come to the conclusion that the test is easy of application and reliable ; that the presence of albumin is an indication of active disease in the lung; and that if other inflammatory diseases be excluded, patients with more than 0.2 per cent of albumin in the sputum may be regarded as suffering from active pulmonary tuberculosis. The test should be used in conjunction with the tuberculin test, which shews whether the disease is active or latent. Alport employs Roger's method of treating the sputum with acetic acid to precipitate the mucin, then after filtration he applies the nitric acid qualitative test for albumin. If the reaction is positive, he estimates the amount by means of Esbach's solution (picric and citric acids.) The average percentage in tuberculous cases was 0.39

the largest amount being 1.3 per cent. In chronic bronchitis no albumin was found, and in two cases of pneumonia the average albumin was 0.5 per cent.

K. Takeuchi has investigated the question of concurrence of albumin, lymphocytic cells, and tubercle bacilli in the sputum. He shews definitely that when tubercle bacilli exist, albumin and lymphocytic and eosinophil cells are also to be seen, and when the bacilli do not exist none of the others are to be found. Consequently, in examining sputum, even though the tubercle bacilli prove to be negative, there is good reason to suspect tuberculosis if the albumin reaction is positive and lymphocytic cells predominate, and the suspicion may be strengthened should eosinophil cells be present.

The advantages of the complement-fixation test in diagnosis of pulmonary tuberculosis in the elderly is commented on by G. Ichok, who says that this disease is often mistaken for bronchitis owing to the appearance of health, or at least of resistance in the patient. He cites the case of a healthy and well-do-do family in whom no trace of tuberculosis existed. This family engaged an elderly governess, who suffered from chronic catarrh and bronchitis, and this person was probably responsible for the death of three of the children from tuberculous meningitis. The governess was removed, and the rest of the family grew up in health.

A.L. Punch has tested the serum of 185 patients by this method, and arrives at the conclusion that in the

complement-fixation test we have a reliable means for the diagnosis of an active or recently active tuberculous lesion, but this applies solely to the pulmonary form of the disease. A negative result is a reliable indication of the absence of such lesion and a positive result of its presence.

Commenting on the value of the negative tuberculin reaction, F.E. Gunter says that he makes a practice of testing all cases in which the diagnosis is not absolutely clear. If they react he treats them on the lines advocated by Camac Wilkinson with excellent results. Those that do not react are not actively tuberculous, and require other lines of treatment. He gives a summary of fourteen cases, each of which was tested with old tuberculin up to 0.01 c.c. with negative results. He places these cases in two categories ; (a) those which, in all probability, have not had tubercle ; (b) those which probably at some time have had tubercle, but in which the disease has been arrested.

What is known as the auto-urine test, or urodermo reaction, has been the subject of some comment, mainly in Continental literature. This reaction was first described by Wildbolz, who shewed that when there is an active process of tuberculosis the urine contains an antigen which, injected intradermally, induces infiltration and redness. This does not occur in healthy persons or in persons with healed tuberculous processes. It never occurs unless the person gives a positive response to tuberculin. A portion of the

patient's urine is evaporated in vacuo to a concentration ½ ; 10 and filtered. Three sets of two injections are then made in the patient's arm ; two with 1 : 1000 tuberculin ; two with 1 : 10,000 tuberculin ; and two with a drop or so of the concentrated urine. In active tuberculosis the response of all three sets of injections is the same, but the tuberculin response persists after the process has healed while the urine response fades out completely. The only non-tuberculous affection which response to the auto-urine test is staphylococcus infection of the urine itself ; no other disease except tuberculosis responds. If the urine reaction persists after the clinical healing of the known process, there is some other active process elsewhere.

The difficulty of the test in practice has been the evaporation of the urine. F. Miche simplifies the technique by evaporating the urine to dryness and dissolving the residue in distilled water to form a 10 per cent solution. He finds the test useful as a control to the tuberculin test, the reaction by the urine test being more pronounced in very active cases and weak in the cases with a more favourable prognosis. In most cases the results are the same as with the tuberculin test, but Miche admits that in a few cases they have conflisted. K. Gramen has found the test invariably positive in the tuberculous and urges further trial of a promising method. R. Offenbacher confirms Miche's experience of results conflicting with the Mantoux intradermal tuberculin test. Ledou says the same and adds that the reaction is much less

sensitive than the tuberculin test. O. Imhof states that responses were constantly negative in the non-tuberculous and (with a single exception) constantly positive whenever there was active tuberculous process. In some cases giving a positive reaction there were no clinical manifestations at the time, but signs of active tuberculosis developed later. The positive response is an infiltration, palpation of a lump in the tissues ; redness and necrosis are not sufficient. Should the kidneys not be secreting sufficiently to admit of the urine test being applied, the patient's serum may be used, the albumin being precipitated with alcohol and by heating the serum for a minute or two. Serum obtained after clotting of the blood does not elicit a response. Alexander employed the test in 91 cases and concludes that (1) a negative Wildbolz reaction does not exclude active tuberculosis ; (2) a positive reaction is a very probable sign of active tuberculosis ; (3) no parallelism exists between the von Pirquet reaction and the auto-urine test ; (4) unevaporated urine does not give the reaction ; (5) urine evaporated in vacuo gives a stronger result than if simply concentrated by boiling. Liebhardt, after a similar investigation, concludes that it is a specific reaction, but of slight intensity and too inconsistent to be of practical value in its present form. C.B. Gibson and W.E. Carroll publish the results of an investigation, and while the number of cases was small their conclusions are on the whole favourable and they call

attention to the statement made by W. Lanz after observation of the auto-urine and auto-serum reactions in more than 300 cases; "In all clinically positive cases of tuberculosis, both reactions give positive results. In all non-tuberculous cases both reactions are negative. If the reaction turns out positive contrary to expectation, then there is positively an undemonstrable but still active tuberculous process in the body. The reactions are the finest diagnostic medium for the discovery of an active tuberculous focus."

As sanatoria were originally introduced with the object of bringing about cure in cases of pulmonary tuberculosis, it is convenient now to give a brief account of open-air treatment.

History of open-air treatment:-

Walters says that one of the earliest advocates of fresh air treatment was a Scotch physician, who in 1747 wrote a letter to his friends in London, insisting on the importance of fresh air and good food. In 1840, Dr George Bodington, of Sutton Coldfield, near Birmingham wrote as follows:- "To live in and breathe freely the open air, without being deterred by the wind or weather, is one important and essential remedy in arresting its progress. The cold is never too severe for the consumptive patient in this climate ; the cooler the air which passes into the lings, the greater will be the benefit the patient will derive.

The common hospital in a large town is the most unfit place imaginable for consumptive patients, and the treatment generally employed there very inefficient, arising from the inadequacy of the means at command." Bodington established a home for the treatment of consumptives, and had some success ; but owing to the opposition of the medical profession, the home was transformed into a lunatic asylum.

In spite of opposition Dr Henry MacCormac of Belfast in 1855 and Sir B. Ward Richardson in 1857 were advocates of open-air treatment.

MacCormac published a book in 1865. In the book he writes:-

"If the inhabitants of Great Britain and Ireland would but consent day and night to live in a pure, unprebreathed atmosphere, it would put a total close to the ravages of consumption and scrofulus white swelling, tabes mesenterica, water on the brain, - in fine, the whole abhorred family of tuberculous disease."

"There is in fact, no panacea in Californian air, no peculiar specific for lung troubles. If one cannot have the summer of California or the winter of sunny Mexico, we possess not the less a climate, whatever some may choose to say against it, replete with almost every possible element of vitality and well-being. We have air as fine as any obtainable in Californian or Mexican hills, air abounding in oxygen and ozone, air, in short, which if we only do not respire it twice, leads to as perfect security from tubercular disease here as there. The shores, almost

any of them, of our own islands, our mountain slopes and airy downs, our many heaths and moors, will often, if not most times, prove preferable to, while they are much more accessible than is any, Nice, or Rome, or Madeira. The material for the possible recovery from phthisis, I repeat, lie around every door."

In Germany, Hermann Brehmer advocated open-air treatment in 1856. He had opened a small house for consumptives in 1854 and five years later along with Von Humboldt and Schönlein, he opened a sanatorium at Görbersdorf, in Silesia.

Dettweiler, a pupil of Brehmer, opened the second sanatorium in Germany at Falkenstein in the Taumas Mountains in 1876.

In 1888 Walter started the famous Nordrach Sanatorium in the Black Forest. Walter to some extent revived Brehmer's methods as regards the use of methodical exercise in suitable cases.

In the United States of America Trudeau carried out open-air treatment in the Adirondacks in 1884.

In 1906 Sir Robert Philip wrote "It is not my purpose on the present occasion to refute the view that sanatorium treatment is a failure. To anyone familiar with the facts this will appear needless. The sanatorium constitutes an important division of the work. But the problem of the extermination of tuberculosis is too vast to be solved in so simple a fashion. The outlook of the sanatorium is towards the recovery of a certain proportion of early cases. But the number of cases ultimately cured by sanatorium treatment is small in proportion to the major issue, namely,

the suppression of the disease.

Tuberculosis is a disease of infectious nature, and as such must be treated on the same broad principles on which are treated other infections. While this is true, there are many difficulties of a practical nature. Although of infectious nature, tuberculosis is a peculiar disease - peculiar in respects of its mode of dissemination and the conditions of environment on which this depend, peculiar in the variety of its manifestations, and peculiar because of its commonly prolonged course. On these grounds, the place of combating tuberculosis cannot be modelled entirely on those which have been found serviceable in the treatment of other fever."

The Sanatorium :-

Sir Robert Philip says "As the result of prolonged experiment and thought on this matter, I am satisfied that the separate one-storeyed pavilion is the best type of building for the purpose. The Royal Victoria Hospital for Consumption, Edinburgh, was designed by Messrs Sydney Mitchell and Wilson, Edinburgh, to meet my views in the matter. After trial of those portions of the building which have been in existence for some years, I can most confidently recommend it as answering every purpose of a sanatorium perfectly.

Each pavilion is of winged form, the obtuse re-treating angle being oriented so as to face south-south east. Each of the two wings constitutes a ward. The three outside walls of the wings consist largely of windows. Thus there is secured a maximum of air

and sunlight. The pavilion is entered from behind. From the entrance passage a short projection northwards contains bathroom and lavatory accommodation. The intervening triangle between the wards and back passage serves as a nurses' room, where simple cooking or other special service may be arranged in the case of patients confined to bed. Opening off the passage also are two dressing rooms for patients' clothes. No luggage or extra clothing is allowed in the wards proper.

Internally the wards conform in all respects to those of a modern isolation hospital as regards smooth surfaces, absence of angles, and unnecessary furniture.

There are no steam or hot water pipes in the pavilions. An open fire is provided. This is less for heating purposes than for the sake of a cheerful appearance and ventilation. There is no attempt made to keep the ward temperature at any fixed point. It is deliberately allowed to approximate to that of the outer air. Lighting is by electricity. The windows are of French form, opening outwards, with swinging fanlights above. These are kept open to the fullest, constantly, both day and night. Thus the patient when indoors is practically as if he were in the open air. The cubic space per bed has been kept about 1200 cubic feet. In view of the entirely free access of air, that amount might be lessened. About 100 square feet of floor area are allowed per bed.

As each patient commonly has a bath daily, the number of bathrooms is considerable, one bath being

provided for every four patients.

The adjacent pavilionsare some 40 feet apart. Each pavilion contains accommodation for eight to twelve patients. The pavilion is raised on pillars some 3 feet above the ground, so that air may circulate freely beneath. The building material is of birch.

Verandahs and balconies have been avoided, as tending to interfere with the entrance of sunshine and passage of free air through the building. The winged form of building is serviceable, as its sides afford shelter to weakly patients, who may be allowed to lie out in front. Hinged screens may be attached to the end of the buildings, so as to afford further shelter.

In addition to the pavilion proper, open shelters are distributed in large numbers throughout the grounds. These are occupied by the patients most of the day and many of them are similarly occupied by night. In a public sanatorium stationary shelters are on the whole advisable, distributed round the periphery of the park, so that they can be more or less governed from a central point. Such shelters should be shallow - only of sufficient depth to accommodate the width of a bed - say 3 to 4 feet. The roof should slope from behind forward and upwards to prevent accumulation of stagnant air. In addition the roof should be provided with skylight or ventilator. The roof and sides shouldbe largely of glass. The shelters are entirely open in front. During wet and more stormy weather, waterproof screens

which are readily attachable afford sufficient shelter.

The sanatorium should be provided with sufficiently extensive private ground, so that walking and other exercises, including games and work, may be enjoyed with comfort. The planting of trees is advisable to break the force of the wind, to aid in drying the soil and to serve as dust catchers.

In addition to the patients who reside for longer periods in the sanatorium, that is, until an effective cure has been attained - a certain number of patients are received at the Royal Victoria Hospital for day treatment returning home at night. When the patients home conditions are sufficiently good, this arrangement has been found to work well. Thereby the extent of the Sanatorium operation is much increased and the excessive demand for admission ".

Diet in Sanatoria.

As Tuberculosis has long been recognised as a neuro-muscular toxaemia, a high protein dietary is all important.

Formerly too much attention was devoted to fattening the patient, with somewhat unhappy results. In some cases, however, a considerable proportion of fat in the dietary is advisable.

Homo-therapy, or the employment of a raw meat dietary is often very beneficial. Due care has to be taken that the meat used is free from tape-worm infection.

The kidneys of patients on a highly nitrogenous diet should be healthy, although some recent work on renal disease may cause us to modify our opinions as to the banefulness of meat.

Galbraith's experiments on tuberculous patients shewed that raw meat was more easily digested than cooked meat, and, further, that its body-building properties were probably greater.

I append the diet table in use at the Royal Victoria Hospital some years ago:-

ROYAL VICTORIA HOSPITAL FOR CONSUMPTION.
EDINBURGH

DIET TABLE.

6 a.m. - 7 a.m. i.e. on rising. Adults: half a pint warm milk (with half a slice of bread & butter) or weak tea.

Children: half a pint warm milk with quarter a slice of bread and butter.

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8 a.m. Breakfast. Week days:
Porridge and half a pint of milk.
Tea.
Bread and Butter.
Eggs when ordered or if provided by the patient.

Sunday:
As above, with
Sausages.
Fish or Ham.

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1 p.m. Dinner. Soup.
Meat and vegetables.
Pudding.

A sufficient variety of each of these to admit of daily change. There are no set dishes for the several days of the week. Thus:-

Soups: Pea.
Lentil.
Barley.
Haricot Bean.
Potato.
Rice.
Vegetable Broth

1 p.m.

DINNER.

(Contd.)

Meats : Roast beef(
Braised beef(
Boiled beef.)
Roast Mutton) hot, sometimes cold.
Boiled mutton(
Roast pork)
Stewed rabbit(
etc.

Vegetables:

Potato.
Onion.
Cabbage.
Other greens.
Turnip.
Carrot.
Beetroot.
Salad according to season.

Puddings :

Rice (Various kinds.)
Tapioca " "
Sago " "
Semolina " "
Cornflour with preserve or stewed fruit.
Suet
Plum.
etc.

Bread and butter are allowed ad libitum.
Half apint of milk or (in summer) buttermilk.

N.B. For special cases onr or more raw eggs immediately before soup, or raw meat in measured quantity with soup or after soup.

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4 p.m. Tea. Cup of tea or warm milk or (in summer) buttermilk. (with quarter slice of bread and butter.

6.30 p.m. Supper.

Various hot dishes e.g.
Liver and bacon.
Tripe.
Fish.
Stewed meats, rabbit.

Cold dishes, e.g.
Roast beef.
Boiled beef.
Braised beef.
Salt beef.
Roast mutton.
Boiled mutton.
Roast pork.
Potted meat.
with bread and butter.

N.B. Raw eggs, raw beef, as at dinner time.

Special dietaries are occasionally ordered for special cases, e.g. more complete milk dietary, raw meat dietary etc.

In rare cases the intervals between meals are shortened.

As graduated exercises are very important in the treatment of pulmonary tuberculosis, the following scheme followed at the Royal Victoria Hospital may be of interest.

ROYAL VICTORIA HOSPITAL FOR CONSUMPTION, EDINBURGH.

SCHEME OF PHYSICAL TREATMENT.

Physical Treatment is an important element in the regime of the Royal Victoria Gospital for Consumption. It is arranged in graduated stages.

On admission, each patient is placed at complete rest. During this stage in addition to minute examination of every organ, the patient's general condition is carefully observed. According to the estimate which is made, the length of the resting period is fixed. Thereafter in the absence of contra-indication, the patient is gradually advanced through the other stages, according to his or her physical condition. The nature and amount of activity are definitely prescribed just like drug treatment. The dose is increased or dminished as the temperature

chart, pulse-rate, and other indications suggest. A coloured badge is given to the patient to denote the stage he has reached.

Badges.

1. Resting Stage:-

(White)

On admission to the Hospital all patients are prescribed complete rest, lasting from a few days to several weeks, according to the individual case.

II. Stage of Regulated Exercises.:-

This includes:-

(Yellow)

1. Walking varying distances, from ¼ to 5 miles - (a) on the level ; (b) on sloping ground.

2. Various respiratory exercises once or twice a day.

3. Other forms of movements to improve carriage of shoulders, head, chest, &c.

III. Stage of Regulated Work :-

The work is chosen with a view to utility and with due regard to the patient's individual case, and to his past trade. This stage is subdivided into four grades (A, B, C, D).

Grade A.

(Pale Blue)

Picking up papers, leaves, and other light rubbish in the grounds. Knitting. Sewing. Drawing.

Grade B.

(Green)

Emptying garden waste-boxes, and assisting to carry away rubbish. Carrying light baskets for various gardening purposes. Light painting work (gates, fences,

furniture, etc.) Wiping shelters. Setting tables, and laying cloth in patients' dining-room. Cleaning silver. Cleaning brasses, towel-rails and taps.

(Deep Blue) Grade C.

Raking. Hoeing. Mowing. Sweeping leaves.
Drawing two-wheeled barrow with assistance.
Other gardening jobs requiring a similar amount of exertion.
Heavier panting work.
Sweeping shelters. Scrubbing floors.
Cleaning boots. Cleaning knives.
Assisting in laundry (folding clothes, etc.)
Washing and drying dishes.

Grade D.

Digging. Sawing.
Carrying heavy baskets for various gardening purposes.
(Red) Wheeling and drawing full wheel-barrow, and other heavy gardening work.
Drawing bath chair.
Bathing other patients.
Mangling. Window cleaning.
Polishing floors. Sweeping and cleaning courtyard.
Carpentering. Joinering.
Attending boiler. Engineer.

N.B. In Grades B.C. and D, patients make their own beds and go errands if necessary.

Tuberculin as a therapeutic Agent :-

Sir Robert Philip holds that tuberculin is a remedy of the first importance in the treatment of tuberculosis. Tuberculin is most useful in cases of glandular tuberculosis, or in superficial tuberculosis of the mucous membrane or skin.

Even Sir Robert Philip, however, admits that tuberculin with improper regulation of doses, or with want of care is dangerous. I think it will be admitted that as regards pulmonary tuberculosis tuberculin has not fulfilled the high hopes entertained at its introduction .

I understand that Moro's method of inunction has been used recently as a therapeutic measure at the Royal Victoria Hospital.

The more common forms of tuberculin in use are:-

Koch's Tuberculin.

1. Old Tuberculin (T.A.)
2. New Tuberculin (T.R.)
3. Bacillus Emulsion (T.E. or B.E.)

Spengler's Tuberculin.

1. Bovine Tubercule Bacilli (P.E. or perlsucht ~~peilsacht~~ emulsion.)
2. Human (T.B.v).
3. Bovine (P.B.v).

Bervaneck's Tuberculin.

This is the preparation which is favoured by Sir Robert Philip.

The treatmant of cases by artificially produced penumothorax is now common. The principal contra-indications are :-

(1) Occurrence of bilateral active processes.
(2) Simultaneous presence of severe disease of the cardio-vascular-renal system.
(3) Diabetes.
(4) Active intestinal tuberculosis

Nitrogen or air may be employed for compression of the lung. The technique of the operation need not be described here. The operation should only be carried out in carefully selected cases, and by a skilled worker.

Short History of "The Edinburgh System".

In 1887 Dr (now Sir Robert) Philip founded the first anti-tuberculosis dispensary. This was situated in Bank Street, Edinburgh. Larger premises were opened in 1891. The Royal Victoria Hospital was opened in 1894, and extended in 1903. In 1905 an open-air school for tuberculous children was opened at the Royal Victoria Hospital. In the following year the Municipality opened a pavilion for advanced cases. In 1907 notification of consumption in Edinburgh was made compulsory, and in the same year the Royal Victoria Hospital was further extended.

In 1910 the Farm Colony at Polton near Lasswade was established.

The present dispensary is situated in Lady Lawson Street, almost beneath the shadow of the Castle Rock. The whole scheme is now under the control of the Municipality. The estate of Southfield, Liberton, near Edinburgh, has been recently bought by the Royal Victorial Hospital Tuberculosis Trust as an independent institution, which will combine the uses of the Sanatorium - the farm colony, the training centre, and the school - for patients requiring prolonged treatment.

Although Edinburgh led the way as regards an

anti-tuberculosis dispensary, New York in 1893 was the pioneer as regards notification of Tuberculosis.

At first notification was required of cases of consumption in all public institutions, and was requested voluntarily from doctors of cases occuring in their private practice. In 1897 the Health Board of New York declared pulmonary tuberculosis to be an "infectious and communicable disease", and required "notification of all cases of consumption occurring in the City".

In 1907, as stated above, notification of cases of consumption was made compulsory in Edinburgh.

In 1912 notification of pulmonary tuberculosis was made compulsory, and in 1914 all forms of tuberculosis became notifiable.

Anti-tuberculosis organization .

Sir Robert Philip says that such an organization "must have an outlook on all sides of the question."

"1. It must have in view the etiological factors which lead to the production of the disease, including both environment and sources of infection.

2. It must recognise the most effective measures for combating these and preventing disease.

3. It must have available means for the estimation of the incidence of the disease and for its detection at the earliest possible moments.

4. It must render available to the community generally the best methods of treatment for the varying forms and stages of the disease, either in institutions or at the patients' homes.

5. It must endeavour by a suitable propaganda to educate the community regarding the causation, prevention, detection, and treatment of the disease.

6. It must insist on a more special training of the medical profession (doctors, nurses, etc.) in the prevention, diagnosis and treatment of tuberculosis.

7. It must seek to turn the experience gained in the working of the scheme to more general use by collating results and by encouraging research with regard to the many-sided aspects of the disease.

It is clear that any anti-tuberculosis scheme will be effective only in proportion as it is based on the facts and needs of the case. In its essentials, an effective tuberculosis scheme should be applicable throughout an entire country. It might, indeed, be uniform throughout the world."

A British Departmental Committee on Tuberculosis (1912-1913) considered the question of an anti-tuberculosis scheme. Sir Robert Philip says, "The principle embodied in the Model Scheme reproduces what had been evolved in the practical solution of the problem from 1887 onwards and had come to be known as the Edinburgh Scheme.

The essentials of the scheme are:-

1. Notification.
2. The Tuberculosis Dispensary with its varying activities.
3. The Sanatorium for the treatment of suitable cases with a view to arrest of the disease.

4. The Hospital with various possibilities for the treatment of acute conditions, segregation of advanced and dying cases, education of more chronic cases, etc.

5. The Working Colony for more continuous treatment on simpler lines of hopeful cases requiring more prolonged care with concurrent training.

6. Care Committees concerned with the social side of the problem and the oversight of the patient from the economic point of view."

Sir Robert Philip points out that notification will become more exact and exhaustive with growing knowledge and refinement of diagnostic methods.

Notification is made to the Medical Officer of Health. Such notifications are usually dealt with by a Tuberculosis Officer, who may make a domiciliary visit after arrangement with the doctor who notified the case.

Sir Robert Philip describes the activities of the first tuberculosis dispensary as follows:-

1. The reception and examination of patients at the dispensary, the keeping a record of every case, with an account of the patients illness, history, surroundings, and present condition ; the record being added to on each subsequent visit.

2. The bacteriological examination of expectoration and other discharges.

3. The instruction of patients how to treat themselves, and how to prevent or minimize the risk of infection to others.

4. The dispensing of necessary medicines, Sputum bottles, disinfectants, and where the patient's condition seemed to warrant it, foodstuffs and the like.

5. The visitation of patients at their own homes by (1) a qualified medical man, and (2) a specially trained nurse for the double purpose of treatment and of investigation into the state of the dwelling and general conditions of life, and the presence of infection in others.

6. The selection of more likely patients for hospital treatment, either of early cases for sanatoria or of late cases for incurable homes, and the supervision where necessary of patients after discharge from Hospital.

7. The guidance, generally of tuberculous patients and their friends and the answering of enquiries from all interested persons on every question concerning tuberculosis.

In addition to dealing with the individual patients, the tuberculosis dispensary also gets in touch with the home.

Visits are made by the dispensary nurse and doctor. Any structural defect in the house is reported in the usual way to the Medical Officer of Health.

The examination of contacts is a very important part of the work of the dispensary, and this should be carried out from time to time. Sir Robert Philip recommends that doubtful cases should be examined every three months.

The dispensary nurseinstructs patients and their relatives as to the treatment and prevention of spread of the disease.

The following Schedule of enquiry should be filled up in eachcase :-

SCHEDULE OF INQUIRY REGARDING DISPENSARY PATIENTS.

Name in Ledger. . . . . Date of Report. . . . .

Name. . . . . Married or Single. . . . . .

Occupation. . . . . Has patient changed occupation. . . . . Able to work full time. . . . . .

Or part time. . . . . .

If unable, confined to bed? . . . . . .

How long ill?. . . . . .

Situation of house (area, ground floor, first floor, etc.) . . . . . .

Number and ages of inmates. . . . . .

Number and description of rooms. . . . . .

General aspect of house (clean, damp, dusty, smelly)? . . . . .

Number of windows ?. . . . . .Can they open?. . . . .

Are they kept open (a) by day? . . . . . .

(b) by night? . . . . . .

Have they always been kept open? . . . . . .

Does patient sleep alone (a) in bed? . . . . . .

(b) in room?. . . . . .

How is washing of clothes done ? . . . . . .

How long in present house ? . . . . . .

If has moved within two years, previous addresses. . . . . .

Have there been illnesses or deaths in house. . . . . .

(a) in own time? . . . . . .

(b) in previous occupancy? . . . . . .

Exposed to infection (a) at home? . . . . . .

(b) at work? . . . . . .

(c) among friends, ...

Present health of other members of the household?. . . . .

What precuations taken to disinfect? . . . . . .

T.B. in Sputum ? . . . . . .

T.B. in dust of room? . . . . . .

General dietary? . . . . . .Teetotal. . . . . .

General condition, well-to-do,badly off)?. . . . . .

Proximate income of household . . . . . .

Assisted by societies, ,church,friends,rates. . . . . .

(Signed) . . . . . .Reporter. . . .

. . . . . .Medical Officer.

A record is also kept of the physical condition of patients. In the case of a patient who is sent to a sanatorium or colony, the actual state is carefully noted. If he is discharged from an institution,a summary of treatment and progress should be added to the record, the case should afterwards be examined from time to time and the progress noted.

Staff of a Tuberculosis Dispensary:-

D.J. Williamson writes:-

" The Paid Staff should consist of:-

(a) One or more medical officers (either part or full time.)
(b) One or more nurses.
(c) A porter. "

Williamson recommends that the porter should be a working man well acquainted with the district and the home conditions of the class of people from which the dispensary draws its patients. He should act as a caretaker of the dispensary premises, and also as a cleaner. When the dispensary is open he takes charge of the waiting rooms, and may pay the part of clerk

in addition to weighing the patients.

Williamson considers that a Voluntary Staff is very important. It is usually composed of health visitors and other volunteer workers, such as secretaries of various Committees.

Equipment of a Tuberculosis Dispensary :-

D.J. Williamson recommends that the accommodation should consist of:-

"One or more waiting rooms.

One or more dressing rooms.

One or more consulting-rooms.

An office (in which the case papers, etc.are kept).

A Dispensary.

A Laboratory.

Caretaker's rooms.

Two dressing-rooms are preferable, but where, as in Paddington, this cannot be secured, one room can be made to do by having separate days for men and for women and children. The rooms throughout the house should be airy and bright and devoid of unnecessary furniture and decorations. The walls should be distempered or painted, but not papered, so that from time to time they may be cleaned and disinfected. For the same reason, the floors should be either polished wood or covered with linoleum.

Receptacles containing carbolic acid or other disinfectant should be placed in every room used by the patients and in the corridors, into which the patients may spit when necessary.

Placed near the entrance should be a weighing machine and height standard. In the consulting rooms there should be a dark cupboard with a lamp for the examination of throats, etc. The laboratory need contain very little except the essential apparatus for the bacteriological examination of sputum and urine. There should be a microscope, centrifuge, and a steriliser."

Williamson points out that the cost of a tuberculosis dispensary on three factors:-

1. The total population of the district or town.
2. The density of the population, i.e., the number of persons per square mile.
3. The death rate from tuberculosis.

Sir Robert Philip recommends that each dispensary should have its statistical department. There should also be a publication and propaganda department to keep alive the public interest in the prevention and treatment of tuberculosis.

Patients attending the dispensary are asked to bring - preferably in a special jar, - a clean specimen of sputum or other discharge for examination. A note is kept of the results of the examination, which should be carried out fairly often if the first examination yields a negative result.

The Sanatorium. The original purpose of the sanatorium in the tuberculosis scheme was the cure of early cases.

Sir Robert Philip says, "A large part of the value of sanatoria has been lost by the lack of exact care in the selection of the suitable patient.

Sanatoria have been blocked by a crowd of wholly unsuitable patients. They have been allowed to become dumping grounds for every sort, and the undesirable (incurable) have been especially in evidence. The result has been hopeless confusion, the piling up of long waiting lists, and the exclusion, at the proper moment, of suitable cases, with the inevitable result that in many instances the suitable have perforce lapsed into the unsuitable. In this way an interminably vicious circle has been established."

The sanatorium, if possible, should be near the large centre of population chiefly interested in a tuberculosis scheme. The educational value of a properly managed sanatorium should not be forgotten.

Open-air Schools:- Goss and Halliday Sutherland say, "There is nothing in the climate of the British Isles to prevent the operation of open-air schools throughout the whole year.

Complete aerotherapy has been practices at the Royal Victoria Hospital for Consumption without a single instance of acute "cold" ; the only complication being chilblains, to which tuberculous patients are peculiarly liable. It has further been the experience that improvement is more marked during the winter than during the summer months."

The Royal Victoria School was opened in 1905. Most of the children at this school are sent in from the dispensary, many being discovered as a result of the "march-past". Some are resident patients,and

some are visitants, being in the districts of the town, within easy reach of the sanatorium (1911).

In an open-air school the hours should be shorter than in ordinary schools, and suitable intervals allowed for rest, dinner, (at the sanatorium), exercises, and light work, e.g., sewing, reading, etc.

The Hospital for incurable and Advanced Cases:-

As a means of prevention of the spread of pulmonary tuberculosis, this department of the scheme is of great importance. While some of the cases are of a chronic character, there are others which are highly dangerous to the community.

In 1890 Sir Robert philip said "With a view of preventing the spread of phthisis among the very poor, for the community's sake, I should have a portion of our city hospital - in lieu of any better institution elsewhere - devoted to the reception of dying cases of phthisis, whose surroundings and hygiene conditions are not only fatal to themselves, but in my judgment, eminently prejudicial to all those who are brought into the close contact with them which the life of a family in one or two rooms involves." The Local Government Board for Scotland (1906) issued a circular which stated that "the isolation of such dangerous cases is a primary duty of the Local Authority".

Such advanced cases should not be allowed to return home, except for exceptional reasons. Even in hopeless cases, the effect of the hospital regimen has sometimes wonderful results as regards prolongation

of life. In 1906, the Municipality of Edinburgh, opened a pavilion for advanced cases of pulmonary tuberculosis. This pavilion with the extra accommodation now provided forms part of the Edinburgh City Hospital at Colinton Mains.

Disinfection of infected houses:-

A. Middleton Hewat suggests the following routine:-

1. On receipt of notification:-

   (a) All rooms in the patient's house.

   (b) All bedding which has been used by the patient and which is going to be used for other members of the household, and (c) the workplace of the patient should be disinfected.

2. At frequent intervals, if patient is treated at home, all rooms occupied by him since the first disinfection should again be disinfected.

3. On removal of the patient to a Sanatorium or other hospital, the house, bedding, clothing and all utensils used by the patient should be disinfected.

4. On removal of the patient to another house, the house previously occupied must be disinfected.

5. On death of patient thorough disinfection of house, bedding, clothing, etc., should be performed.

Disinfection should be carried out by a sanitary official.

The working colony:-

The objects of the working colony are roughly grouped below:-

1. To keep under medical supervision cases of tuberculosis, which are almost, but not quite, well enough to leave the sanatorium proper. The transference of patients to the colony allows the addition of a fresh

batch of patients to the sanatorium.

2. To combine ergotherapy and aero-therapy with economic return. The colony may become)to a greater or less extent) self-supporting.

3. To teach patients a suitable out-door occupation, with a view to their return to ordinary life.

A working colony requires a special type of resident physician. In addition to an expert knowledge of tuberculosis, he must have organising ability, and if possible should be conversant with up-to-date methods of farming, poultry-rearing, et hoc genus omne.

In 1910 a working colony in connection with the Royal Victoria Hospital was opened at Springfield, Polton, in the parish of Lasswade. The district is one redolent of Scott, De Quincey, and Drummond of Hawthornden.

The colony is situated not far from "the murmuring Esk" and in the vicinity may be seen the "hills of home", where the wind still blows - "austere but pure."

This colony at its opening was intended for only some twenty-five or thirty patients and comprised some fifty acres of land.

Many out-door pursuits were followed, but I understand that pig-rearing, which has been sadly neglected in Scotland has proved to be one of the most profitable of the various activities.

Routine examination of patients should be carried out at suitable intervals, and weekly weighing is of course of paramount importance.

Patients may lose some weight on entry to the colony, but the general condition as a rule is improved by the regular and healthy work.

The Middle Ward of Lanarkshire instituted a working colony at Hallmyres, near East Kilbride in 1919. This venture is of a much more ambitious nature than the Edinburgh Colony. It deals with children as well as adults, and looks forward to treating no less than three hundred patients. Full particulars of this Colony may be found in the booklet attached to this thesis.

Care Committees :-

Sir Robert Philip says "The purpose of the Care Committee is to deal with economic and other domestic conditions which play a large part in the successful management of tuberculosis.....The information regarding cases will commonly be furnished to the Care Committee by the Tuberculosis Offices or one of the doctors or nurses attached to the Tuberculosis Dispensary. ....The information thus applied is discussed by the Committee with a view to suitable action.....

The efforts of a Care Committee may conveniently take such directions as:-

)1) The improvement of accommodation for the patient and the household through better arrangement of the house, or the removal of one or more persons to other quarters or by "flitting" to a larger house.

(2) Provision of extra clothing - bed and personal - when necessary.

(3) Provision of extra food supplies or invalid comforts when necessary

(4) Guidance as to the purchase of suitable food and how best to cook it.

(5) Arrangements for household washing.

(6) Selection of suitable work either for the patient or for other members of the household.

(7) Financial assistance to households when the chief wage-earner is unfit for work and perhaps in sanatorium or hospital.

(8) Care of the children especially when the mother is under treatment."

Suitable occupation for the tuberculous patient:-

(The list given by Sir Robert Philip is quoted in extenso, but perhaps a note of warning should be sounded as regardsthe occupation of chauffeurs. To drive a car is one thing - to start a cold refractory engine or to change a stiff tyre cover is another, and sometimes the form of work calls for a great deal of responsibility as well as hard exertion.)

Employments :-

Employments suitable for the Tuberculous.-

For Men:-

Basket-makers ;

Bath-chairmen;

Canvassers ;

Caretakers (if accommodation is satisfactory).

Carpenters ;

Chauffeurs (private, taxi, motor-bus) ;

Cpachmen ;

Collectors (rents, debts, etc.)

Commissionaires ;

Conductors (bus. tramway car, etc.)

Drivers, (bus, cab, van.) ;

Farm Labourers ;

Fishermen (special Departments) ;

Foresters ;

Game-keepers ;

Gardeners (private, market) not glass-house work);

General Labourers (except very dust jobs) ;

Hawkers ;

Insurance and Commission Agents ;

Joiners ;

Lodge-porters ;

Motor cleaners ;

Painters and Decorators ;

Park Attendants, and rangers ;

Policemen (if already in the service) ;

Porters (light) ;

Postmen (if already in the service) ;

Sanatorium employers ;

Employments for men (continued) :-

Sandwich men ;

Ship-stewards (if accommodation is good) ;

Station book-stall attendants) ;

Ticket Collectors ;

Time-keepers ;

Travellers ;

Watchmen ;

Window-cleaners ;

Wood-carvers ;

Woodmen ;

Wood-road layers.

For Boys (unless well enough to be apprenticed to a healthy trade)

Errand Boys ;

Gold caddies ;

Messenger boys ;

News boys ;

Telegraph boys (if already in the service)

Van boys.

Employments for Women :

Button-hole makers ;

Caretakers (if accommodation satisfactory)

Cashiers (if airy premises.)

Charwomen (under good conditions) ;

Cash sorters ;

Dressmakers ;

Farm-workers (except in dairy)

Flower sellers ;

French polishers ;

Gardeners (private, market etc.)

Hop-pickers ;

Housemaid work (in easy place,) not in charge of children, food etc.)

Ironers, folders and menders (in Laundry).

Lace Makers ;

Leather workers ;

Message girls ;

Milliners ;

Needleworkers ; (embroidery etc.)

Net-makers ;

Pea-pickers;

Poultry-farmers;

Sanatorium Servants ;

Secretaries (skilled and unskilled);

Shop assistants (in any premises)

Teachers in Open-air schools ;

Umbrella Makers ;

Waistcoat makers - and such occupations suggested for men as may be suitable.

Recent Legislation:-

The National Health Insurance Act of 1911 provided, (inter alia) that Sanatorium Benefit was one of the benefits to be afforded to insured persons suffering from Tuberculosis, and required Insurance Committees to make arrangements with a view to providing treatment for insured persons suffering from Tuberculosis.

Section 64 (1) of the National Insurance Act, read in connection with Section 16 (1) (b) of the Finance Act, 1911, made available a sum of £1,500,000 for the

purpose of the provision of and making grants-in-aid to Sanatoria and other Institutions in the United Kingdom. The money is available for the provision of institutions for the use of the whole population. The £1,500,000 is to be apportioned between England, Wales, Scotland and Ireland, in proportion to their respective populations on the Census of 1911.

Thus, roughly, about £1,116,000 will be apportioned to England, £81,000 to Wales, £158,000 to Scotland, and £145,000 to Ireland. The Government also undertook to pay 50 per cent of the cost of treatment of all cases undertaken by Local Authorities.

That is to say, capital grants in respect of buildings for treating the disease are to be given by the Treasury and the half cost of treatment provided by the Local Authorities is also met from the Imperial Funds.

Apropos of Sanatorium benefit, Dr Leslie Mackenzie says, "It would greatly help the administrative authorities of those concerned mainly in clinical work would remember that no single organisation meets the whole problem ; that no one anti-tuberculous institution can properly be regarded as an exclusive alternative to any other ; that with a disease so various, so widely diffused, so treacherous, the only road to success is patient study of individual cases, patient study of individual environments, and patient correlation of all administrative methods to the purpose of treating each individual patient

according to his needs and each individual environment according to its condition."

A new Act of importance is the Public Health (Tuberculosis) Act, of 1921, which does not apply to Scotland or Ireland. A copy of this Act and also of the Public Health (Officers) Act of 1921 will be found attached to this thesis.

Recently village settlements have been set up, the principal being one of "voluntary segregation", cases at all stages of the disease being dealt with.

It is also sometimes arranged that whole families should be housed in separate cottages within the settlement. Crocket strongly opposes the system in the following words:-

"Village settlements are at the present time receiving a good deal of attention. There are indications that the Government are prepared to establish ten of these in various parts of the country, each to accommodate 200 to 250, at an estimated cost of £1,000,000. This sum, the Minister of Health declares will not suffice, and he is right. It would probably require three or four times as much. I personally strongly disapprove of them, and that for various reasons. Let me mention but a few:-

They are really an untried experiment. Their value, as has been stated, is theoretical rather than practical.

They are a side issue and are likely to deviate effective efforts from proved and proper lines.

They are expensive, and expenditure of money on them is likely to swallow up the cost required for more profitable methods of combating the disease, the provision of adequate accommodation for advanced cases, and of additional accommodation for sanatorium cases if patients are to receive the long periods of treatment which are so absolutely necessary.

They are supposed to be for arrested cases. In my experience really arrested cases of the disease are anxious to get away from anything suggestive of tuberculosis institutions. They do not desire to be regarded as pariahs by the rest of the country any longer than is possible. Far less would they like their wives and children to be stamped as tainted, and to be avoided.

They favour the marriage of tuberculous people, and the propagation of individuals with a low degree of immunity, and who are possibly infected from early years.

They do not take cognizance of the fact that tuberculous patients have a small short expectation of life. Thirty-two per cent of all cises die within one year of the diseae being recognised ; 54 per cent within two years ; 74 per cent within three years ; 82 per cent without four years ; 85 per cent within five years. Only 15 per cent tuberculous patients are alive after five years. Fifty per cent of those who are supposed to have arrested disease die within five years.

Suppose that we had such colonies, and that two to five years after admission a tuberculous patient who had settled in one of the homes with his wife and family died, what would happen ? The wife and children presumably not tuberculous, would have to leave and make room for another family with a tuberculous father, to leave to return to a cheerless town or city,

and strive to gain a footing and build up a home without the aid of the father. The last state would be worse than the first. Further, as Chalmers pointed out, of the class that could be helped, few, very few, would be willing to enter and continue in such colony. The State should be more careful with its money , and prove thoroughly the value of one such settlement before launching out on a large scale.

I am quite sure that if the Interdepartmental Committee whose report we have in our hands had called as witnesses more men and women who for many years have devoted their lives tothis form of work, such as tuberculosis officers, sanatoria superintendents and as medical officers of health, the decision arrived at would have been different."

The number of insured persons receiving sanatorium benefit from January 1st to December 31st 1918, in the United Kingdom was 41,541, as against 38,093 in 1917. There was a total of 48,265 cases of tuberculosis receiving treatment in various forms in 1918, as compared with 49,102 in the previous year. The approximate expenditure last year in the United Kingdom was £854,000 against £796,000 in 1917. Approved tuberculosis dispensaries last year numbered 375 in England, 23 in Scotland, and 180 in Ireland, and there were 81 visiting stations in Wales. The number of insured persons receiving treatment in Scotland during 1918 was 3424, of whom 2490 were males and 934 females, against 3283 (2259 males and 1024 females) in 1917. The cases of tuberculosis in 1918 were

3496 (2553 males and 943 females), compared with 3465 (2049 males and 1056 females) in 1917. The approximate expenditure of Insurance Committees on the provision of sanatorium benefit in Scotland in 1918 was £105,000, against £93,000 in 1917. The approximate number of beds occupied at one time in 1918 in Scotland was 1011.

We may sum up briefly as follows:-

1. Tuberculosis is almost world-wide in its distribution, occurs at all ages, and causes appalling mortality.
2. Tuberculosis causes great economic loss, as it especially occurs at the working age of life.
3. Tuberculosis is a specific infection, caused by the tubercle bacillis and is infectious, although not in all cases.
4. The disease in man can almost certainly be caused both by the human and bovine type of bacillus.
5. Whitla and Symmers have produced pulmonary tuberculosis by ingestion of tuberculous material in animals.
6. The disease is rife in crowded cities, and especially in these districts which are densely populated.
7. Indoor occupations, especially those of a dusty nature, predispose to the disease.
8. Debility, malnutrition, exhaustion, venereal disease, infectious diseases of children, poverty and alcoholism, all play their part in lowering the resistance of the individual to the attack of the tubercle bacillus.

9. An infected milk-supply may cause tuberculosis, more especially "surgical tuberculosis" in children.

10. The disease is much more common in children than was formerly supposed.

As regards legislation, the National Health Insurance Act of 1911, while providing for the treatment of cases of tuberculosis, is limited in scope.

In order to stamp out tuberculosis the campaign against the disease must be world-wide, and methods of prevention must be both general and special.

General.

The more important points are:-

1. A non-tuberculous milk-supply.
2. Care of the children by means of
   (a) Infant and Child Welfare schemes. (Some centres have established night nurseries for tuberculous contacts.)
   (b) Special care during the infectious illnesses of childhood.
   (c) School Medical Inspection.
   (d) Training of older children in the laws of hygiene, domestic economy and the general principles of nursing.
3. Provision of suitable houses for the working-classes, either by reconstruction of existing dwellings or the building of new houses.

4. Heightening of the general resistance of the individual by a campaign against poverty, Malnutrition, alcoholism and venereal disease (It has recently been shewn that 18% of the patients at the Royal Victoria Hospital for Consumption gave a positive Wassermann reaction.)

5. Thorough ventilation of all work-places and free access to open spaces.

Special Measures:-

The establishment of a co-ordinated anti-tuberculosis scheme in connection with every large centre of population.

What of the outlook at home ?

The present is a time which calls for all the optimism which we can muster. The terrible war years have left a deep impress upon the social fabric.

Not only have we now an heritage of increase in disease, but we are faced by difficult problems in the realm of finance. To take but one instance, the Governments Housing Schemes have failed financially, and houses are also being found unsuitable for the class of people for which they were intended.

After the reckless prodigality of the war years, economy is now being practised in many directions. The public dislike of officialdom is well-known, and the public health service is already suffering.

The City of Manchester recently offered a salary of £1500 per annum for the post of Medical Officer of

Health, while a wealthy city, to wit, Glasgow, thinks fit to offer £450 per annum for the post of Assistant School Medical Officer, under present economic conditions,

As a straw is said to shew the direction of the wind, it may be inferred that as little money as possible will be spent in carrying on anti-tuberculosis schemes, until some recovery in trade takes place, and financial conditions become more stable.

Money is sometimes referred to as the "sinews of war." It also forms the sinews of public health effort, and the position today is a somewhat sad one, following as it does upon the comparatively easy financial position which existed before August 1914.

Many of us have, no doubt, noticed the inscription below the clock in the New University Quadrangle - "Ars longa, Vita brevis" Is it too much to hope that, while time is fleeting, Art is also long? Or in the words of the late Sir William Turner, "Great is Science, and it will prevail?" Although the day when tuberculosis will be no more may be far distant, let us be inspired meanwhile by the spirit of the poet who visited Edinburgh for a short time:-

"O man! hold thee on in courage of soul
Through the stormy shades of thy worldly way
And the billows of cloud that around thee roll
Shall sleep in the light of a wondrous day".

And, while we remember Edinburgh as the pioneer in the prevention of tuberculosis, the fons et origo of modern methods, let us also remember, now and always, the motto of the proud and ancient City - "Nisi Dominus Frustra" - Except the Lord build the house, they labour in vain that build it."

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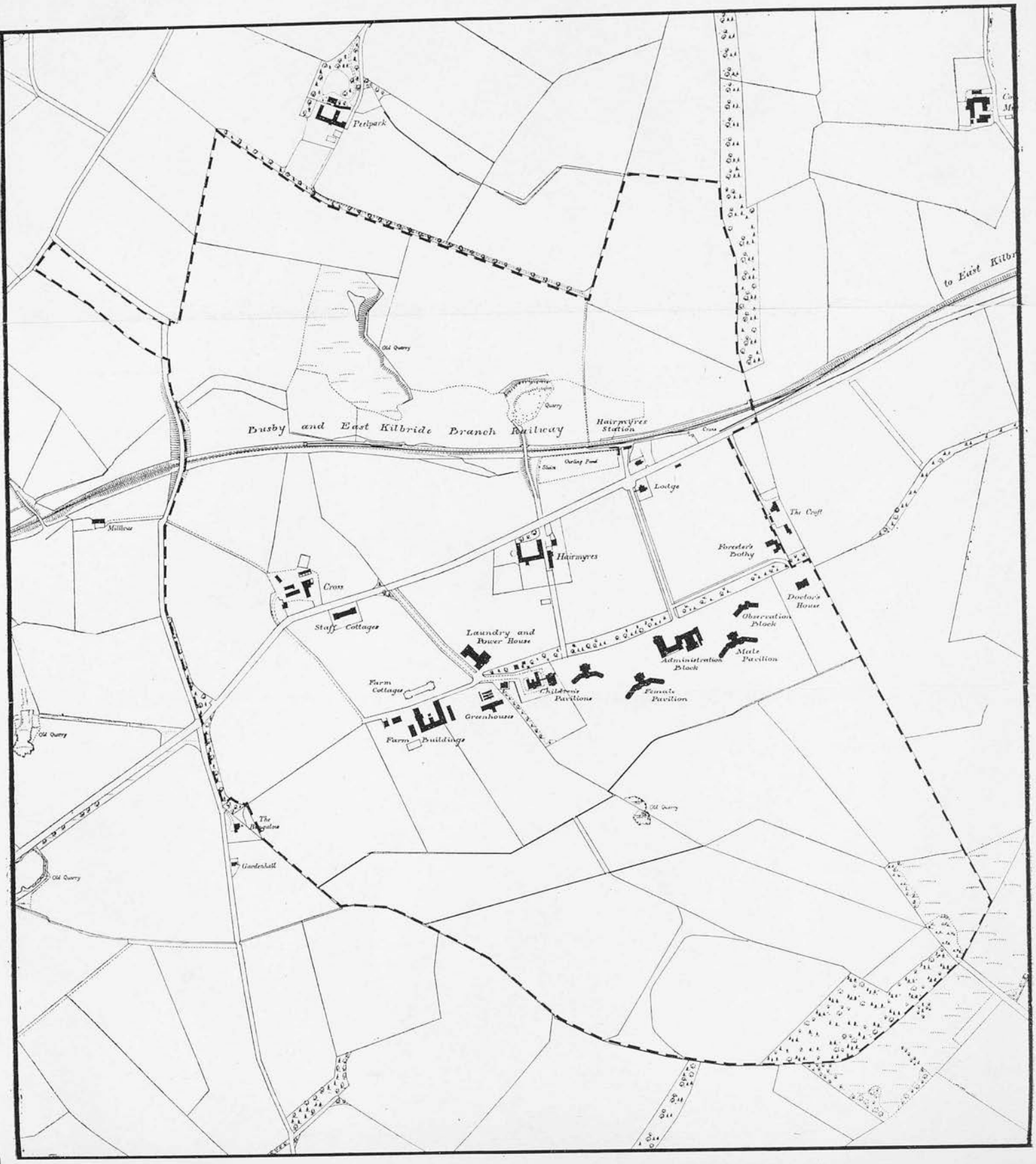
COUNTY OF LANARK

The Hairmyres Colony

1919



PLAN OF COLONY.

COUNTY OF LANARK.

BROCHURE

OF

THE HAIRMYRES COLONY SCHEME.

(PREPARED BY W. E. WHYTE, DISTRICT CLERK, HAMILTON.)

1919.

HAIRMYRES COLONY.

Inaugurated by the Right Hon. Robert Munro, K.C., M.P., Secretary for Scotland, Saturday, 14th June, 1919.

MEMBERS OF HAIRMYRES COMMITTEE.

WILLIAM BARR.
JOHN A. BEATTIE.
OWEN COYLE.
JOHN CRAIG.
GEORGE FRASER.
WILLIAM GARDNER.
ROBERT HAMILTON.
ROBERT LAMBIE.
WILLIAM LOVE.
JOSEPH SULLIVAN, M.B.E.
WILLIAM TEMPLETON.
DAVID THOMSON.

GEORGE FRASER, Chairman.
W. E. WHYTE, O.B.E., Clerk and Treasurer.

JOHN T. WILSON, M.D., D.P.H., Medical Officer of Health.
A. H. MACPHERSON, L.R.C.P. & S.(Ed.), Resident Physician-Superintendent.
Miss GRAY, Matron.
Miss SYMON, Teacher.

Architects — SYDNEY MITCHELL & WILSON, Edinburgh.

THE HAIRMYRES COLONY.

THE Hairmyres Colony may be said to have been conceived and established out of the experience of the District Committee of the Middle Ward of Lanarkshire in the treatment of Tuberculosis.

As far back as the year 1905 the District Committee made a beginning with the treatment of Pulmonary Tuberculosis under a system of voluntary notification. With the experience thus gained they decided, on 20th November, 1907, to make this form of Tuberculosis compulsorily notifiable within their District for a period of five years, and at the same time they proceeded to develop their institutional and other arrangements for the treatment of the disease. Additional officers were appointed to the Public Health Staff: the existing institutional arrangements were recast, and a Scheme and Organisation were set up to deal with the disease on the most advanced lines.

As from 1st August, 1912, Pulmonary Tuberculosis was made a compulsorily notifiable disease throughout Scotland. Non-Pulmonary or Surgical Tuberculosis was made compulsorily notifiable throughout Scotland as from 1st July, 1914.

The situation was further affected by the passing of the National Health Insurance Act, 1911, which provided, *inter alia,* that "Sanatorium Benefit" was one of the benefits to be afforded to insured persons suffering from Tuberculosis, and required Insurance Committees

" to make arrangements with a view to providing treatment for insured persons suffering from Tuberculosis." It may be here mentioned that, by arrangement between the Local Authorities and the Insurance Committee for the County of Lanark, the former undertake the treatment of all insured persons, the Insurance Committee paying over the funds available to them for Sanatorium Benefit. In this way duplication of work is in great measure avoided.

Section 64 (1) of the National Insurance Act, read in connection with Section 16 (1) (*b*) of the Finance Act, 1911, made available a sum of £1,500,000 for the purpose of the provision of and making grants-in-aid to sanatoria and other Institutions in the United Kingdom. The money is available for the provision of Institutions for the use of the whole population. The £1,500,000 is to be apportioned between England, Wales, Scotland, and Ireland, in proportion to their respective populations on the census of 1911. Thus, roughly, about £1,116,000 will be apportioned to England, £81,000 to Wales, £158,000 to Scotland, and £145,000 to Ireland.

Recognising the need for earnest efforts being made to cope with the disease, the Government have also undertaken to pay 50 per cent. of the cost of treatment of all cases undertaken by Local Authorities. That is to say, capital grants in respect of buildings for treating the disease are to be given by the Treasury, and the half cost of treatment provided by the Local Authorities is also met from Imperial Funds.

In respect of their pioneer work—undertaken at a time when few Local Authorities were taking any steps in the matter—and in view of the experience gained from same, the District Committee were in a position, immediately on the passing of the National Insurance

Act, to admit to their Institutions all suitable cases within their own District, and, in addition, they have accommodated, from time to time, patients from the Districts of a number of other Local Authorities.

The District Committee decided that the nucleus of their Tuberculosis Scheme should be their existing Institutions and agencies, which, by a rearrangement of the work and the carrying out of certain extensions and alterations at the various hospitals, could, they were satisfied, be made suitable to cope with the disease.

But while they did all they could in the matter of treatment of those affected with the disease, it was gradually realised that the provision was inadequate and that something more required to be done (1) in the interests of the patients themselves; (2) in the interests of their relatives and the community generally; and (3) in the ratepayers' interest, for it was clearly evident that the system in operation of taking a man into a sanatorium for a period of, say, three months, and then discharging him to return to his former occupation and conditions of living was really extravagant, as he was very soon under the care of the Local Authority again. There was, in fact, no permanent betterment possible under such a sectional and, one might almost say, short-sighted policy. When, therefore, Local Authorities were required to provide comprehensive schemes of treatment for the disease, the Mid-Lanark District Committee, in addition to providing at their central hospital, near Motherwell, wards for observation of cases sent in, and for surgical treatment of non-pulmonary cases, and also sanatorium wards at seven other hospitals distributed over the District, decided to make a real and practical effort to attack and overcome the disease in as thorough and far-reaching a manner as possible.

" After care " was recognised by the " Astor " Report as one of the most important factors and considerations

in dealing with Tuberculosis, but, notwithstanding its importance, it has not, so far, enlisted the practical sympathy of many Local Authorities to the extent of inducing them to make provision for seeing a patient through to a betterment and restoration which would fit him to be a useful citizen and enable him to live out his life under fairly normal circumstances and conditions.

It is surprising that this should be so, for it must be the universal experience of Local Authorities and all others interested in the subject that the method of dealing with the tuberculous which has hitherto obtained is wholly insufficient in its scope and entirely unsatisfactory in its results.

As matters stand at present, sanatorium treatment in practice is faced with two difficulties—

(1) The patient frequently comes under treatment too late. Often this results from the patient being a wage-earner, with others dependent upon him. Though consciously failing in health, he may hesitate to seek medical advice; or even after he has ascertained the nature of his malady, he may decline to surrender his livelihood by going into a sanatorium.

(2) A patient under sanatorium treatment may so far recover as to feel able to return to work, but before he can settle down to the pace of the mine or the steelwork he may break down again, or his health may again give way entirely on account of the condition of his labour or even of his home.

The Tuberculosis Officer in many instances will tell the miner and the steelworker that to give himself a chance to live he must give up his trade and take up

ADMINISTRATION BLOCK.

an outdoor occupation. Wages in the mines and steelworks generally rule high—even for boys—and that is an inducement to hereditary employment. Frequently it is a necessity to retain the father in regular employment though in failing health.

The miner or steelworker, therefore, generally knows no other trade, and an outdoor occupation in most cases means to him that of a labourer. As a labourer, because of his physical weakness, he will generally be at a low-grade pay. The reduction of income means in many cases insufficient nourishment either for himself or for his wife and children, and most likely necessitates living in a cheap and unsatisfactory house.

These facts and circumstances go to show that to be successful every Scheme must be comprehensive, and provide training as well as treatment. Mental and physical work as an integral part of treatment are of undoubted value, but such work must be carried on under medical supervision for such hours only as the patient, in the opinion of an experienced doctor, is able. That is the essence of the Hairmyres Colony Scheme.

The various sections of the comprehensive Scheme which the District Committee are in course of setting up are these :—

1. The Local Dispensaries.
2. The Sanatoria.
3. The Hairmyres Colony.

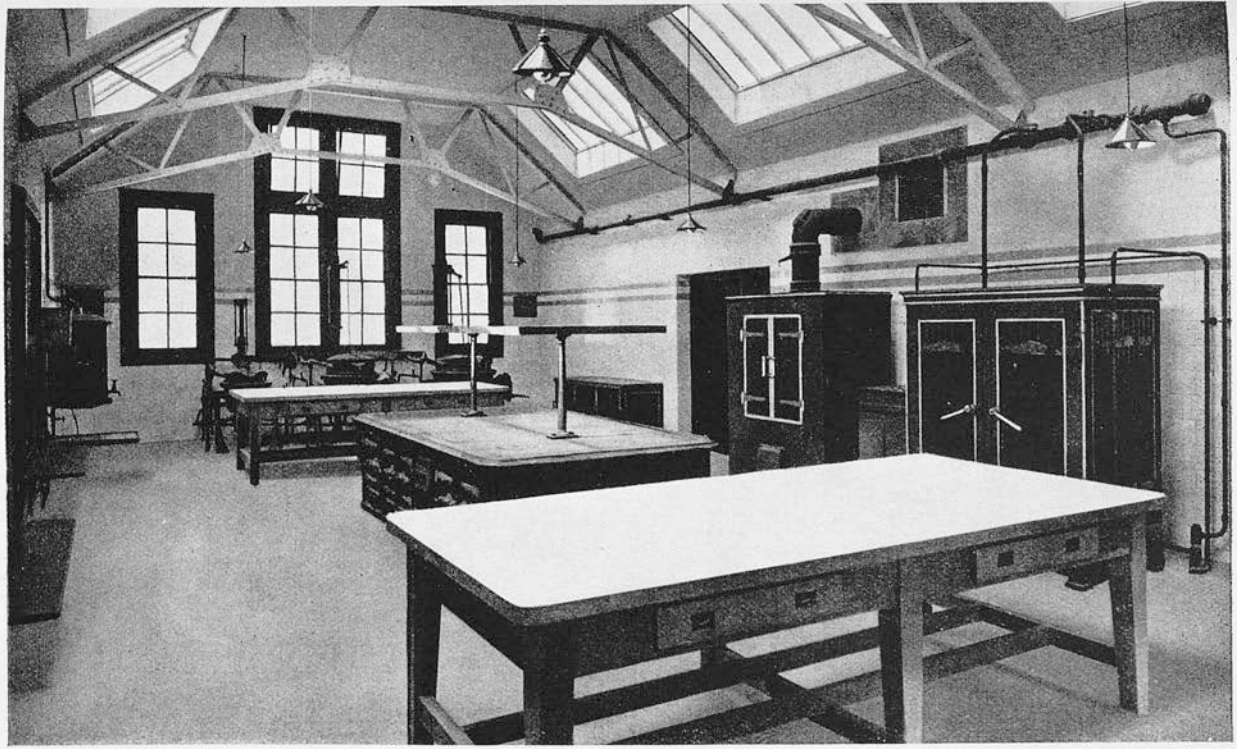
Domiciliary treatment will also be carried on on the most approved lines.

The Dispensaries will be suitably distributed throughout the area. The existing sanatoria are so located as to admirably meet the needs of the District, and the Colony is centrally placed in relation to the County as a whole.

The Colony is intended for two classes of patients—(1) selected adult cases which have shown such improvement that further treatment of a special character is desirable; and (2) children. The adult cases will be carefully selected. They will be those which in the various sanatoria have made satisfactory progress in the arrestment of the disease; they will be cases which have undergone a period of "habit and health training," whose condition has improved to such an extent that further and advanced treatment is essential and the patients themselves are desirous of following out a course of training as well as treatment. These cases will be transferred to Hairmyres, and will there undergo a special course of treatment combined with training and tuition in rural labour.

It is clearly necessary that there should be a continuation of treatment along less expensive lines for those sanatorium patients likely to develop a recrudescence of the disease, and it is for this class of case that the Farm Colony proves its utility. One of the reasons for the designation "Farm Colony" was to enable the colonist to obtain employment without being labelled an invalid, thereby tending to reduce his market value. But while farming operations form a distinctive feature, other industries are included, such as forestry, with its various ramifications, market gardening, and industrial workshops, &c. Nor is any Colony complete without an open-air school for children. Hairmyres Colony embraces the above features, and it is capable of indefinite expansion. Patients who no longer require the services of a nursing staff are transferred to the Colony, thus relieving pressure on the sanatorium.

The Colony Scheme, in addition to being in intimate co-operation with the various sanatoria in the Middle Ward, provides also the first stage of the Middle Ward Afforestation Scheme.



KITCHEN.

PAVILION.

The Colony, which extends to about 300 acres, is situated about 8 miles from Glasgow, and Hairmyres Station is practically on the Colony lands.

At Hairmyres, as already explained, accommodation will be provided for male and female adults, and also for children, and in order to give occupation and education to the patients—both of which are considered to be essential for proper treatment—there are included in the Scheme a farm, market garden, and forest nursery.

Accommodation has been provided for 250-300 patients. The pavilions stand at an elevation of 580 feet above sea-level. They are of the butterfly type, and are erected on the ridge of a gentle slope facing the south, thus ensuring the maximum of sunshine. They command a magnificent view of the surrounding country. The pavilions, administrative block, and associated buildings are spread over an area embracing 30 acres. An established belt of trees gives adequate protection from the north, and shelter belts have been planted to afford cover from the prevailing winds. The Institution is fitted and equipped with all the most modern appliances.

The buildings comprising the Sanatorium and Farm Colony are—

Administration Block.
Male Pavilion.
Female Pavilion.
Observation Block.
Children's Pavilion.
Laundry and Power House.
Farm Buildings.
Two Rows of Cottages for Farm Manager, Farm Staff, and Engineers.
House for Resident Physician.
Gate Lodge.

In addition to the above-mentioned new buildings, all of which have been erected during the period of the war, the Inebriates Home, which was erected on the site some years ago, is being altered so as to form an Administration Block and School for the children, the intention being to keep the children entirely separate from the adults.

Lay-out.—The principal entrance to the Institution is immediately opposite Hairmyres Railway Station, a new avenue having been formed from that point leading in a southerly direction up to the crest of a ridge running east and west, along which there is a belt of trees.

A Gate Lodge is placed at the entrance to the avenue, but the whole of the buildings for the patients are placed to the south of the belt of trees, which affords protection from the north winds.

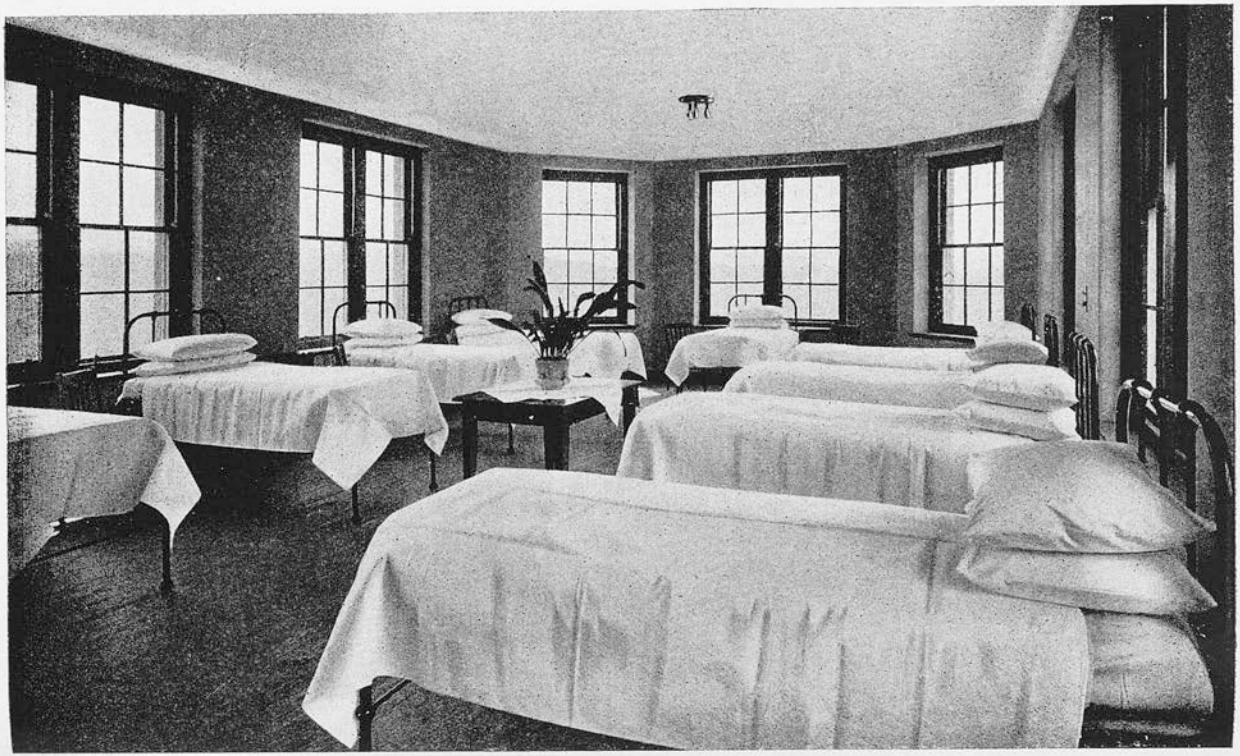
From the belt of trees the ground slopes to the south, and the whole of the patients' buildings thus have an exposure to the south, with a fine, uninterrupted view.

At the head of the main avenue, immediately after passing through the belt of trees, is placed the Administration Block. The avenue is there divided, and runs in an easterly and westerly direction along the crest of the ridge on the south side of the belt of trees, serving to the east the Observation Block, Male Pavilion, Doctor's House, while to the west the avenue serves the Female Pavilion, Children's Pavilion, Children's Administration Block, Laundry and Power House, Farm Buildings, and one row of cottages for farm staff. The other row of cottages has been placed on the main East Kilbride-Eaglesham Road, and close to the Cross Farm (which forms part of the Colony), which is to be utilised as a piggery.

Construction.—The whole of the new buildings have been constructed with hollow brick walls, harled on the outside and having an exposed red brick base.

The original intention was to cover the roofs with red Roman tiles, but owing to war conditions it was found impossible to obtain a sufficient supply of these, and Ballachulish slates had to be adopted instead, with consequent considerable loss in the appearance of the buildings.

Administration Block.—The Administration Block is a two-storeyed building in which, in addition to the usual



requirements for the general administration of the Institution, provision has been made for the accommodation of the Nursing Staff, thus saving some expense which would have been incurred in erecting a separate Nurses' Home.

The scheme is arranged in two sections, the western section containing the administration rooms and nurses' quarters; the eastern section containing dining hall for male and female patients, kitchen and service departments, as well as accommodation for the service staff.

The main entrance is placed in the north-west portion of the building, with a waiting room for visitors near the entrance.

In the west wing, ground floor, are placed doctor's consultation room and office, dispensary, patients' waiting room, and committee room.

In the centre of the western section, and facing south, are arranged on the ground floor, matron's sitting-room, accommodation for an assistant doctor, consisting of sitting-room, bedroom, and bathroom, as well as a dining-room and sitting-room for the nurses.

The whole of these rooms have access to the south on to a paved terrace.

The whole of the upper floor of the western section is occupied by bedrooms for the matron and nurses, with the requisite lavatory apartments.

The entrance to the service, or eastern wing, is placed in the centre of the north front, and leads to a wide corridor running east and west, off which are arranged, on the north side, stores, larders, and cold storage accommodation. The kitchen is placed to the south of the corridor and centrally in the east section, and is only a one-storeyed building, lighted both from the roof and by windows placed in the end walls.

South of the kitchen is the dining hall for male and female adult patients, separated from the kitchen by a servery, with hot-plate and service hatches. The dining hall has entrances arranged for the patients at both the east and west ends, with cloak-room accommodation. Off the dining hall are also arranged pantries for the patients washing their own dishes.

Dining hall, lavatories, pantries, and servery are also only one-storeyed buildings.

In the east wings of the service block, on the ground floor, are arranged dining rooms, pantry, and lavatory accommodation for the maids.

In the upper floor of the service wing have been arranged sleeping quarters for the maids, and a large combined linen and sewing room.

Male and Female Pavilions.—The male and female pavilions are similar in plan, being each two-storeyed blocks of the butterfly form, providing accommodation for 74 patients each, and are placed a short distance down the slope to the south-east and south-west, respectively, of the administration block.

The plan of the ground and upper floors are the same, both having on each floor two wards at the east and west ends, each for 10 patients, four 3-bed wards and a 5-bed ward, with nurses duty room and linen room placed centrally.

The lavatory annex is arranged centrally, to the north of the main block and contains on each floor boot room, dressing room, bathrooms—both plunge and shower—and lavatory accommodation.

At the side of the corridor joining the main block and the lavatory annex are arranged apartments for slops and sterilising sputum mugs.

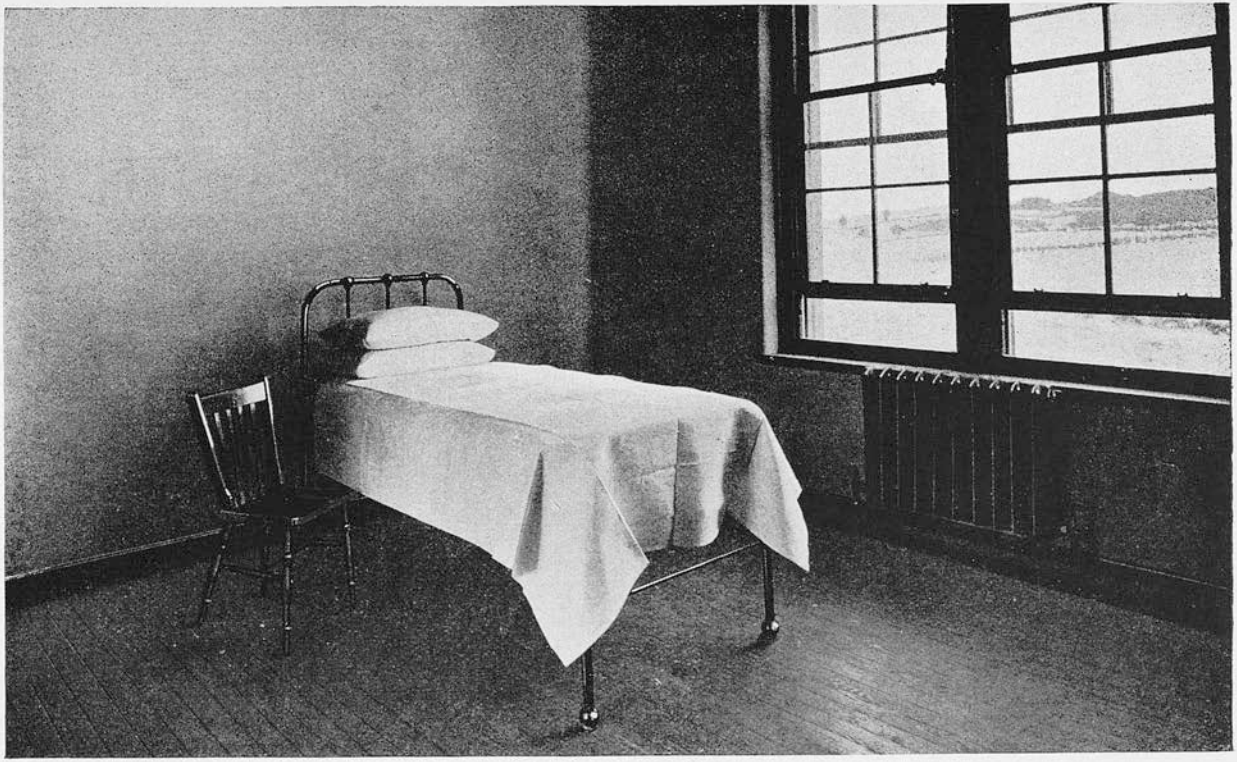
In the centre portion a basement has been formed in both buildings, providing boot brushing rooms, drying rooms, and storage for patients' boxes.

Observation Block.—The observation block is a one-storeyed building, also of the butterfly form, and is arranged for both male and female patients, having accommodation for 14 patients—7 of each sex. For each sex there is provided one 3-bed ward and 4 single-bed wards, with lavatory accommodation arranged in an annex placed to the north.

A nurses' duty room and linen rooms and slop accommodation are arranged centrally.

Children's Pavilion.—The Children's Pavilion is a two-storeyed building similar to the Male and Female Pavilions, with the exception that there is not a 5-bed ward provided.

The building has accommodation for 64 children—32 on each floor. In addition, 20 children can be accommodated



WARD—SINGLE BED.

in a pavilion recently erected just to the east of the Children's Administration Block, making in all accommodation for 84 children.

Children's Administration Block.—The building, which was originally intended for an Inebriates' Home, is being remodelled so as to form the Children's Administration Block.

Accommodation will be provided for dining the children, with separate kitchen accommodation, play room and school rooms, all on the ground floor, while on the first floor accommodation will be provided for the matron, nurses, and schoolmistress required for the supervision of the children.

Laundry and Power House.—The Laundry and Power House, as well as garage accommodation and Mortuary, have been arranged in one building for economy.

This building has been placed a short distance to the west of the patients' buildings, and screened from them by the belt of trees above referred to, and access to the building can be had both from the old and new avenues.

The building contains laundry and wash-house departments, with the usual receiving and despatch rooms, and provision has been made for washing the staff and patients' clothes separately.

Laundry and washing machinery are electrically driven.

In the Power House provision has been made for two large steam boilers, two direct-coupled steam-driven electric generating sets and steam-heated calorifiers, for supplying both the hot-water service and water for the heating installation throughout the whole Institution. The exhaust steam is utilised in the calorifiers, but provision has been made for using live steam as well when required.

Underground ducts have been provided from the Power House to all the buildings, and the whole of the steam, water, electric light, and telephone mains have been fixed to the walls of the ducts.

The centralisation of the heating and hot-water service for the whole Institution will result in considerable economy both in upkeep and wages.

Garage accommodation for three cars has been provided, and an engineer's workshop, forge, and weighing machine are being installed.

Farm Buildings.—The Farm Buildings are placed at the west end of the ridge on which the Institution is built, and the buildings form three sides of a square, with the dairy and milk house projecting into the centre of the court so formed.

In the east wing are arranged stable for seven horses, two loose boxes, harness room, implement shed, and killing house.

In the west wing are two byres, one for 24 cows, the other for 12 cows, two bull boxes and two calf pens. A large root shed is also provided in this wing with convenient access to the byres and bull boxes.

The south wing is a two-storeyed block and connects the east and west wings. In it there has been placed a large food-preparing house next the byre for 24 cows, straw barn, hay house, with grain loft and food store on the upper floor, over the straw barn and food-preparing house.

Threshing machinery, electrically driven, is being installed.

The dairy, dairy scullery, and milk house are placed centrally between the east and west wings, projecting from the straw barn towards the north.

Cottages.—One row of five cottages has been erected near the Cross Farm with access from the main East Kilbride-Eaglesham road, for the accommodation of the farm workers.

Each cottage has two storeys, having on the ground floor, living room, scullery, bathroom and w.c., larder, and on the first floor, two bedrooms, with ample press accommodation on both floors. The rooms have all been arranged with a southern exposure.

The second row of cottages is to be erected to the north of the Farm Buildings, for the accommodation of the farm manager, head gardener, dairymaid, and engineers. The cottages are to be of two storeys, having on the ground floor living room, parlour, scullery, and on the first floor two bedrooms, bathroom, and w.c.

The two end houses of the row will, in addition, each have a third bedroom.

CHILDREN'S ADMINISTRATIVE SECTION.

House for Resident Physician.—The Doctor's house is situated at the east end of the ridge on which the Institution is built, and is a two-storeyed building, having dining-room, drawing-room, study, five bedrooms, kitchen, and servants' accommodation.

Gate Lodge.—The Gate Lodge is placed to the east of the main entrance, and is so situated that it commands a view of the main entrance and avenue.

The building is of one storey-square in plan, with all the chimneys collected in a centre stalk, and has living room, two bedrooms, scullery, bathroom, and w.c., larder and store.

Garden and Grounds.—The grounds adjoining the patients' buildings have been terraced to form tennis lawns and flower gardens, and have been well laid out and planted under the supervision of the head gardener of the Institution.

A nursery garden has been formed between the Children's Administration Block and the Female Pavilion, with a southern exposure.

Green-houses have been erected and are heated off the main Institution heating service.

Gardens for the children are being provided to the south of the children's administration block.

The afforestation section is placed to the east of the main avenue.

* * * * * *

Farming.—From the experience gained, the Local Authority are satisfied that it is expedient to make the work as varied and interesting for the patients as possible, and for this reason there are all branches of arable farming, as well as stock rearing. When a patient is sufficiently improved and of proved reliability, it is important to give responsibility, and probably nothing will be more conducive to securing the exercise of "mind over matter" than the care of live stock, because they are a source of daily interest to anyone employed among them.

Dairy Herd.—A fine herd of non-tuberculous Ayrshire cows has been established. Calves will be reared in sufficient numbers to maintain the herd without requiring purchase in the open market, and the stock will be housed under conditions that will maintain good health.

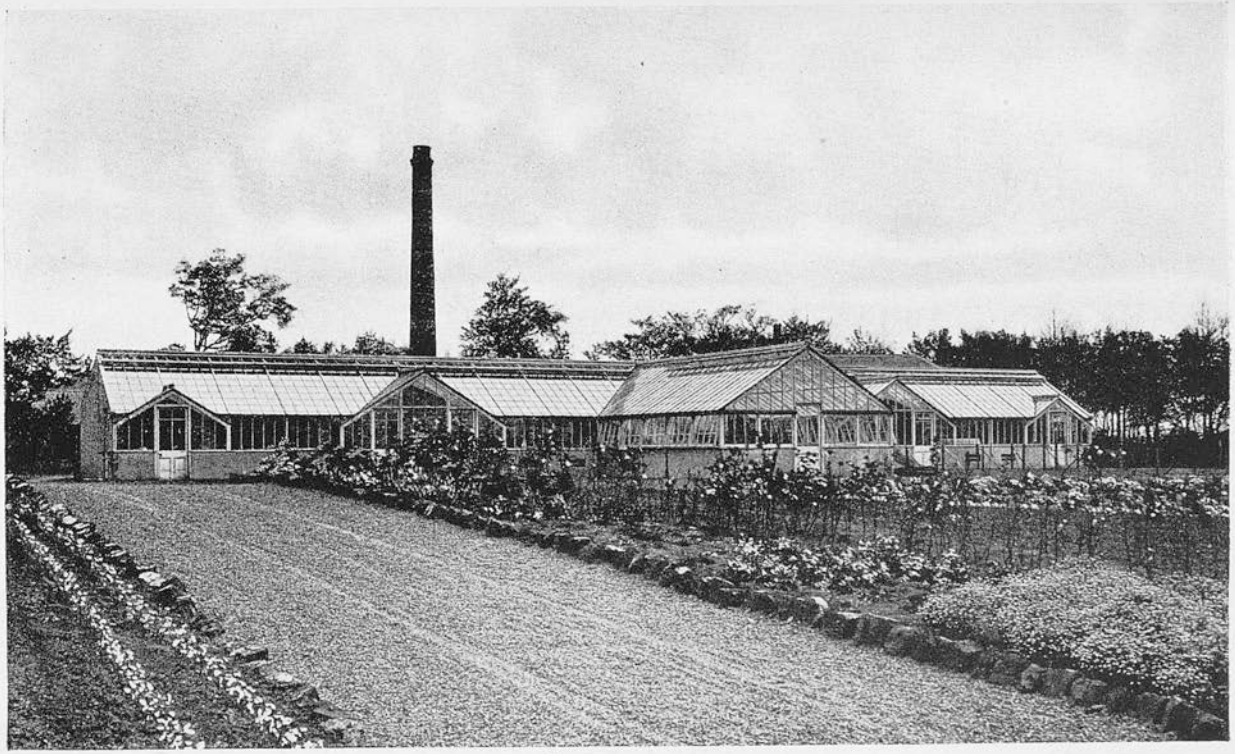
A large supply of milk will be required for the children alone when the Colony is fully established. Experts are agreed that a great amount of preventible disease is disseminated through milk, and the measures which the District Committee have taken for ensuring a pure and wholesome milk supply are amply justified. The care of tuberculous children is to be one of the special features of the Scheme, and it has been felt that every reasonable provision and safeguard for their treatment is amply warranted.

Pig-rearing.—It is inevitable that at every large Institution there is a considerable amount of "brock" or waste that can be turned to profitable use, such as for the feeding of pigs. Pig-rearing is a very healthy occupation, and no stock will turn over money more quickly than pigs.

Poultry-rearing on a large scale has proved a most useful means to sustain interest and to give employment to the less able.

Market Gardening is a most valuable agency in supplying various grades of activity. The training will be sufficiently comprehensive to instruct a patient in all branches—inside or outside.

Forestry.—Afforestation is now recognised on all hands as a national necessity, and it may be assumed that employment on a large scale will follow. It is certain to open up to those impaired in health a very suitable occupation. The Resident Physician emphasises



GREENHOUSES.

CHILDREN'S WARD.

FORMING ROAD IN FOREST NURSERY.

that there is a marked physical improvement to be noted in the general health of the workers who come from time to time to work in the Forest Garden, and that the patients who are employed on this work invariably derive great benefit. The work, he states, is as valuable a sedative in excitable cases as it is a stimulant to respiration and circulation in those convalescent from acute and chronic illnesses. At Hairmyres training in seed-bed and nursery cultivation will be given, also training in saw-milling. The latter is an essential part of a forester's training, and for the Colony is important in that it will provide employment for patients on wet days when they are unable to work on the land.

About 7,000 acres of land have been acquired at the District Committee's water areas at Camps, near Crawford, and the planting operations were commenced in 1916. The forestry scheme is being established and wrought under arrangement with the Development Commissioners, and in co-operation with the Board of Agriculture for Scotland.

But the agencies of the Local Authority do not end here. They expect to be able to make arrangements with certain organisations for having the patients placed in suitable situations so soon as they are qualified. The Committee's aim and object, therefore, is, in short, to take charge of a hopeful case when it comes under their notice, right through, it is hoped, to a successful completion.

The District Committee view this part of the Scheme as giving much promise of successful practical results. Patients who have proved their fitness to continue what they have learned at Hairmyres will have an opportunity of following out forestry work at Camps (where suitable accommodation on simple but sanatorium lines has been provided), for which they will be paid a wage—not

perhaps a full wage, but sufficient to enable them to continue for a further period on their curative work—all with the ultimate object of fitting them to undertake similar or other outdoor work either in this country or in the Colonies.

The District Committee propose to make commercial use of the Hairmyres patients who are being trained in forestry as far as that is possible. One of the Schemes they have decided upon is to employ the men in planting and tending the hedgerows, shrubs, and plants in connection with the new Housing Schemes about to be embarked upon. It is estimated that, in connection with the Middle Ward of Lanarkshire Housing Schemes, some 40 men could be steadily employed in this way with profit both to themselves and the Local Authority.

While Camps Afforestation will be worked as an integral part of the Hairmyres Colony Scheme, it is likewise an important factor in the Water Scheme, as through afforestation of the catchment areas the Committee will be able to prove whether forests affect the rainfall, whether they regulate the flow of the water and whether they act as filters.

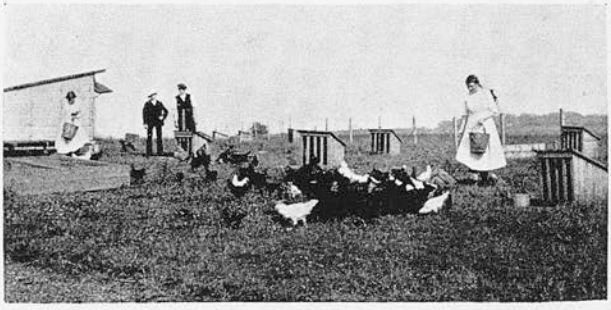
At Hairmyres it has been found that the children are keen on the nursery work, and it is surprising how soon they become expert in lining out the plants, and at other work not requiring great physical strength.

The present forest nursery at Hairmyres extends to over 9 acres, and a bothy has been erected to accommodate workers who are not patients. An extension of the nursery area by 9 or 10 acres is contemplated on an early date, under arrangement with the Board of Agriculture.

The Colony Scheme will meantime serve the County of Lanark, including the Burghs of Lanark and Biggar

FOREST NURSERY: CHILDREN WEEDING SEED BEDS.

CHILDREN HOEING.



POULTRY FARM.

(a population of about 300,000), but it is hoped that at no distant date the area which it will serve will be greatly extended. Schemes of the character of Hairmyres cannot reasonably be provided for limited areas. They must be essentially national in their scope and application. Localities will probably be best served by having their own sanatoria, but there is good reason for and undoubted economy in their joining forces in a Colony Scheme to which their patients may pass after institutional treatment. Mid-Lanark will welcome such an extension of the sphere of usefulness of their Hairmyres Scheme.

It may be urged in some quarters that the Colony Scheme has still to prove its worth, and that we have not yet reached the stage of knowledge and understanding of the subject as to justify the considerable expense and effort which such a Scheme as the Hairmyres Colony entails. What precisely is the history of the efforts up till the present time?

It was found from actual and extended experience—as already mentioned—that simply to afford hospital or sanatorium treatment to a large percentage of persons affected with the disease, and then to discharge them with no alternative but to resume their former occupation —which in most cases in an industrial County like Lanarkshire is wholly unsuited to their condition—was entirely futile.

The hard logic of the Scheme cannot—it is suggested—be contested. What has been the net result of the efforts up till the present time to deal with Tuberculosis? A temporary improvement: a temporary encouragement to the unfortunate person affected: a short prolongation of his existence! No radical betterment. And what

of the public effort and cost of it all? The expenditure of a vast amount of energy at enormous expense to the community. Neither the hospital nor the sanatorium can do efficient work without the co-operation of the after-care Colony: they are not designed and have not within them the wherewithal to do anything permanent in the great majority of cases. The most they can do is to alleviate the condition: to inculcate improved habits and afford instruction in the care of the person. They serve the purpose that they remove the infected person from the household, and so long as the housing conditions remain what they are this is a beneficent work. *But efforts and expenditure ought to be directed towards restoration,* if restoration is at all possible. And it is believed—fully believed—that it is possible beyond question in many cases, especially the early cases and the predisposed cases and the numberless other hopeful cases which require to be directed into the proper channels where the means and the measures are available to open up a new life in every sense of the term. On the human side, every effort and every energy that may secure restoration to working efficiency of those affected with Tuberculosis must be welcomed and supported. On the side of cost—for as a Public Local Authority the expenditure must be prudent and justified—consider for a moment what it means. 50,000 people die every year in this country from Pulmonary Tuberculosis; 25,000 succumb annually from other forms of Tuberculosis; and there are over 500,000 infected persons who require to be dealt with and treated. Statistics, while showing the mortality from Tuberculosis, do not throw any light on the insidious onset of the disease which frequently results in the permanent impairment of vitality and consequent loss in working efficiency. What does this mean in the loss of productive power to the industry and commerce of the country? Many millions of pounds annually. Accordingly, if a half or a third or even a

tenth of those people were restored to working fitness, or enabled even to prolong their working lives by a matter of, say, ten years, the financial benefit to their families and to the nation would be stupendous. It is believed this restoration can be brought about, but certainly not along the lines hitherto followed. The old methods, of themselves, have failed; no tangible results have been obtained; energy and expense have been incurred with no proportionate return or gain. But one cannot decry the present system and methods, which were conceived in the light of the knowledge available and with the best possible intention. We can only learn and progress from experience and test. The present Institutions and Schemes are still necessary; they are parts of the whole, and will have their place as the early training and directing agencies from which patients will progress to the Colony. The whole Scheme must be conceived and wrought in sections, all focusing to a definite purpose and outlet. The Dispensary for detection of the ailment, for examination of contacts, and for advice; the Sanatorium for continued and specialised observation and the building up to an improved state of health; the Colony for "hardening off" and training under medical and expert supervision and advice, and leading to a new sphere of occupation from which a livelihood may be derived and a sound measure of health enjoyed. The effort has, it is believed, all the possibilities of success. The results so far attained from the Colony Scheme have been encouraging to a degree. Over 200 children have been admitted to the Colony, and with few exceptions they have made exceedingly satisfactory progress. Four typical cases might be shortly referred to:—

A.B., dye-worker, age 17 years.

This young man was at work and was asked to visit the dispensary, where it was found that he was suffering from pulmonary and glandular tuberculosis. He was admitted

to Stonehouse Sanatorium, and after a residence of some 8 months was discharged with the disease arrested. For a time he got gardening work in the locality, and while at this work his condition remained satisfactory. Failing to obtain employment of this nature he entered a steel work, and very soon showed signs of relapse. He was admitted to Hairmyres and employed on the Forestry staff, made a good recovery and joined the army. He spent two years in France and enjoyed excellent health. Was demobilised and is now employed on the Forestry staff at Camps.

Home Conditions.—House.—3 apartments on ground flat.

Records of the family show—

Father, mother, sister, all infected and now deceased.

Remaining members of the family—

Sister, age 20 years. No evidence of infection.

Brother, age 7 years. Do. do.

C.D., age 14 years.

When 6 years of age he had whooping-cough and had never been well since. He had a persistent cough and spit, and a bilateral involvement of both lungs, with marked retraction of the chest wall. On two separate occasions he was admitted to Stonehouse Sanatorium, and spent a period of some months at Bellshill Sanatorium, from which he was transferred to the Farm Colony. He worked daily for a period suitable to his condition in the Forest garden and very quickly showed signs of improvement. His weight on admission was 5 st. $8\frac{1}{4}$ lbs., and in 12 months it increased to 7 st. 4 lbs.—a gain of 1 st. $9\frac{3}{4}$ lbs. From a pathetic-looking, depressed boy he developed into a useful member of the community and was engaged on the Farm staff.

His case affords a striking illustration of the necessity for an open-air school where treatment and education can go hand-in-hand. During his 8 years of debility he was unable to attend school and was quite uneducated. He is now discharged from the Colony and is employed on contracting work at a wage of over £3 per week.

FOREST NURSERY: CHILDREN CLEANING LINES.

CHILDREN PICKING FRUIT.

CHILDREN AND PATIENTS HAYMAKING.

Home Conditions.—House.—1 room on ground floor (2 recess beds, one open and cot).

Family History.—Father alive and in the army. Mother alive but not strong.

Brothers.—Charles, age 11 years, admitted to the Colony suffering from pulmonary tuberculosis. Has always been a delicate child.

Thomas, age 9 years, admitted to the Colony suffering from pulmonary and glandular tuberculosis, with pleuritic adhesions at the base of left lung.

George, age 7 years, admitted to the Colony suffering from pulmonary tuberculosis, with mastoid abscess.

One brother apparently well.

Two sisters apparently well.

E. F., age 12 years.

Duration of illness, probably 2½ years. Anæmic-looking boy, and slightly emaciated. Has pulmonary and glandular tuberculosis. Was a resident patient at the Colony for four months, and although making good progress his mother removed him to assist at home.

Home Conditions.—Two-room house in tenement.

Family History.—Father.—Age 35 years. Has advanced pulmonary tuberculosis. Has undergone one year's treatment in a sanatorium. Is under observation at the dispensary, and there is no prospect of his being able to resume work again. Since his return from the sanatorium he assists in the house.

Mother.—Alive and works during night time in a factory.

Daughter.—Age 9 years, has developed a cough, and is under observation at the dispensary.

Son.—Age 7 years, has tuberculous spinal disease, and has been in Shotts Sanatorium for 6 months.

Daughter.—Age 3½ years, died from tuberculous meningitis.

Son.—Age 8½ years, died from broncho-pneumonia. No doubt tuberculous in origin.

G. H., age 7 years, admitted September, 1918.

Suffering from pulmonary tuberculosis. Has improved greatly and put on weight. He is now apparently well and fit.

Home Conditions.—House.—One apartment.

Family History.—Father.—Died in Shotts Sanatorium two years ago from pulmonary tuberculosis.

Mother.—Alive and apparently well.

The family consisted of twelve children. Ten died from consumption.

One apparently well.

The following extract from a Report by the Teacher at Hairmyres is of decided interest:—

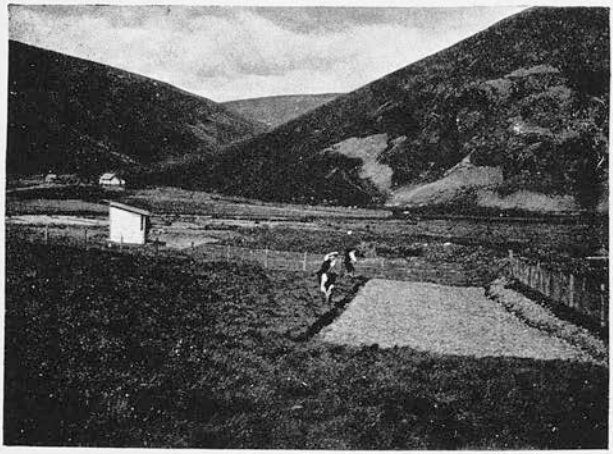
* * * * * *

"The low standard of mental development and the inert and lifeless mental attitude exhibited by most of the cases admitted to Hairmyres are very striking features. Almost without exception the children are far below the average in intelligence and attainments, without being actually mentally deficient, and this impaired mental ability must, in most cases, be largely attributed to physical causes. After a few weeks' residence the beneficial effect of living under proper hygienic conditions, with regularity of meals and hours of rest, becomes very apparent, and the marked and evident improvement in the physical condition of the child is invariably accompanied by a corresponding increase in mental activity and alertness, and a gradual improvement in the powers of concentration and attention, previously conspicuously lacking.

"The great variety of interests opened up by the activities of the various departments of the Colony is a very important factor in arousing the interest of the children in all matters relating to an outdoor life, and assists very materially in promoting their mental development.

"The outdoor occupations frequently engaged in by them in the afternoons, when weather permits, also tend to rouse and stimulate interest of this kind, and, apart from the economic value of the work, have a

CAMPS NURSERY.



CAMPS AFFORESTATION AREA:
PLANTING GROUND AND NURSERY.

most beneficial effect both on the physical and mental well-being of the children. (Preparation for an outdoor life an aim worthy of consideration.) The benefit will be even more marked when it is possible to allocate a small plot of ground to each child, for which he will be responsible, and where he will work regularly for a certain part of each day."

* * * * * *

In his recent Report on the School at Hairmyres His Majesty's Inspector of Schools said :—

* * * * * *

"Of the 24 pupils on the roll, 21 were present on the day of examination, and were tested in virtually all the subjects of instruction. It was evident that very good progress had been made by all the scholars, who had enjoyed the advantages of the school for some considerable time. A small number of recently enrolled pupils will require careful handling to bring them into line; but the great improvement in respect of mental alertness, good manners, and general demeanour realised by the earlier arrivals makes one hopeful that these others will in time derive equal benefit from the skilful, judicious, and kindly training of the Schoolmistress."

* * * * * *

While many difficulties will no doubt arise in the operation of the Scheme, it is firmly believed that success lies along the path selected, if the Government, the Local Authority, and the people affected are all prepared to do their part. The Government must be more generously disposed as regards giving State aid to the effort: they must assist in the proper maintenance of the patient and his family while he is fitting himself for a new calling, for this is one of the most important considerations affecting the success of the Scheme. Improved powers must be made available to Local Authorities to deal with and control those affected, and the latter must be brought to a realisation of what it will mean to themselves and

their families to undertake a course of training and direction which is designed to make them fit citizens, able to take their place alongside the workers of the country. It is part of the cure that the tuberculous should work; that their minds should be occupied; that they should be interested. No real betterment will be secured if a patient has time upon his hands to dwell upon his ailment. Work must be the medium of the cure, and the work must be selected and graded according to the condition of the patient and under medical supervision. These considerations must unquestionably be the basis of any scheme of reform and improvement: it is upon them that the Hairmyres Colony Scheme has been founded, and the spirit which has animated the Local Authority in formulating this ambitious effort in the sphere of the public health only requires, it is believed, to be exercised and applied in the operation of the Scheme to ensure the success it seeks and warrants.

The advantages of the Colony Scheme may be summed up as follows:—

1. The tuberculous person is restored to his place as a working unit at an earlier date than is otherwise possible, with the risk of relapse reduced to a minimum.
2. He is hardened physically, and the conditions under which he works aid materially in the complete overthrow of the tubercle bacillus and the neutralisation of its toxic products in the tissues of the body.
3. The return to social functions has to the individual a most potent effect upon his whole system. He is no longer leading a mere hospital existence. He forms one of the productive members of the community, and the stimulus and interest to personal effort speedily show themselves in his bearing and temperament.

The Local Authority entered upon their Scheme for the treatment of Tuberculosis with enthusiasm and energy. They have realised that they must go further than what was originally contemplated : that there is no standing still in this matter until they have successfully mastered the problem. If it were otherwise they would, in view of the experience that has been gained, pass to despair and end in cynicism, the cynicism born of a mistaken notion that nothing can be done. They believe that something can be done, something real, something tangible, something lasting. The Hairmyres Scheme has been created and established out of this belief.

ROBERT ANDERSON, PRINTER, GLASGOW.

SCOTTISH BOARD OF HEALTH.

The Government's Offer

To Persons

Who Want Houses.

GIFT OF £260.

THE GOVERNMENT OFFERS TO EVERY PERSON BUILDING A HOUSE THAT CONFORMS WITH A FEW SIMPLE CONDITIONS A GIFT OF A SUM VARYING FROM £230 TO £260.

HOW TO GET THE SUBSIDY.

NO RED TAPE.

There is no vexatious procedure to be gone through with Government Departments. If you want the subsidy, all you have to do is to get the site and house plans approved by your Local Authority (Town or County Council or District Committee). So soon as the Local Authority approve your plans, they grant you a certificate to the effect that the house is eligible for subsidy. Whenever the house is ready for occupation you will obtain a certificate from the Local Authority to the effect that it has been completed in a proper and workmanlike manner, and the subsidy will be paid to you immediately, direct by the Government.

The subsidy is thus guaranteed at the commencement, and there is no delay in payment.

A GIFT NOT A LOAN.

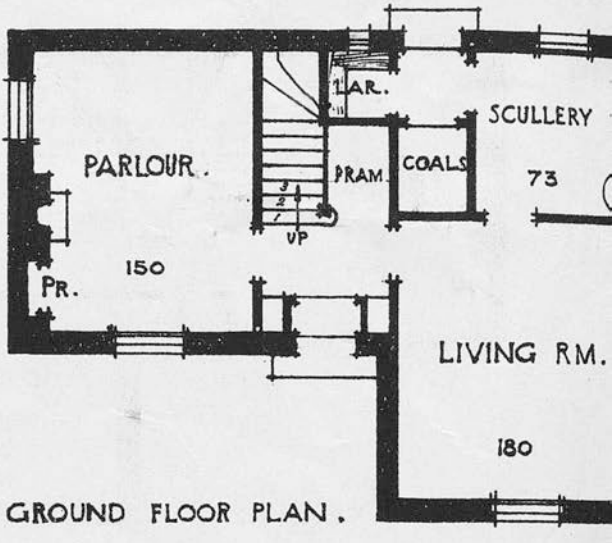
It should be noted that the subsidy is a gift, *not a loan.* When the house is completed and the subsidy is paid the whole transaction is ended, and you may dispose of the house in any way you please.

AMOUNT OF SUBSIDY.

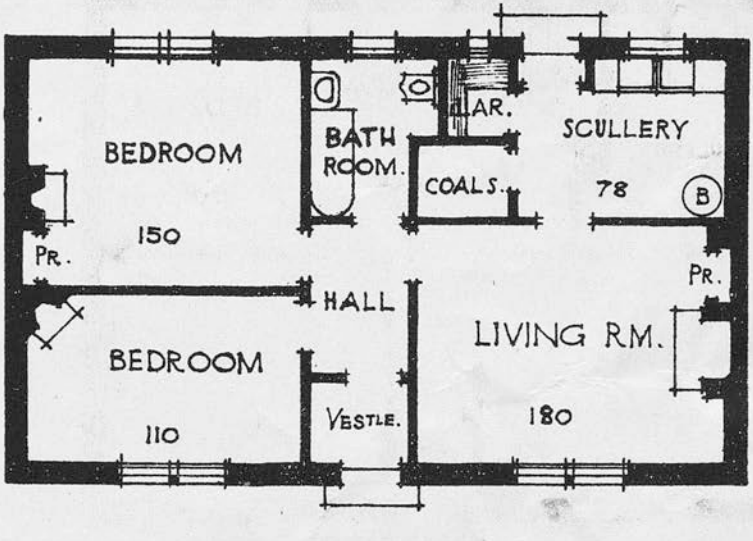
The subsidy varies as shown in the following table according to the size of the house to be built, but you know before you start the amount for which the house is eligible.

M & G Ltd Wt 4689/3780 7–20 20,000 (2) G. 2

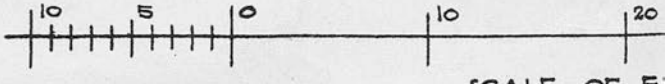
FIVE



GROUND FLOOR PLAN.



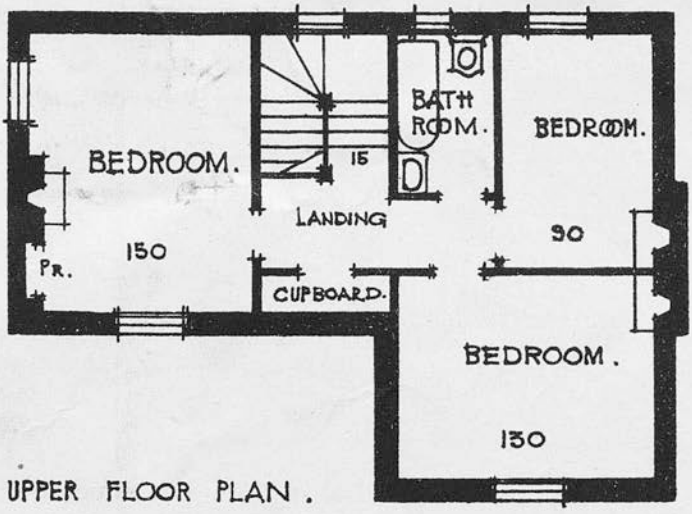
THREE APARTMENT HOUSE.



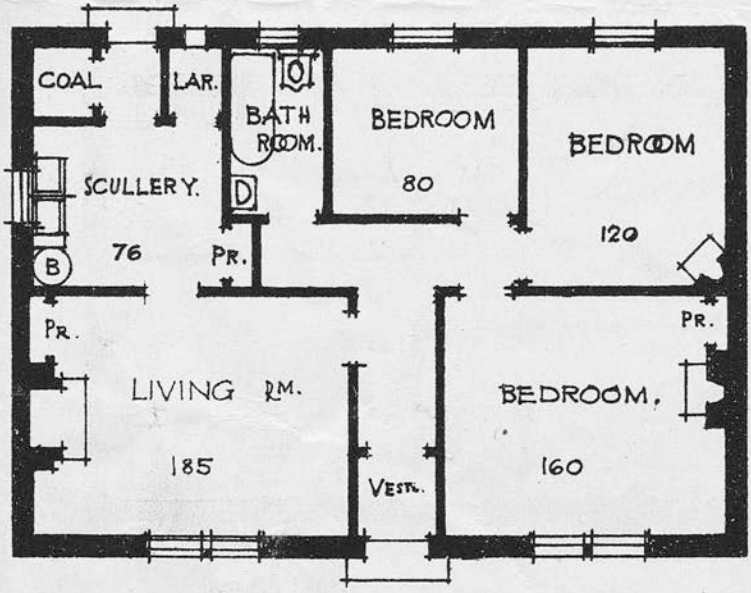
SCALE OF F

E BUILT WITH THE AID OF THE SUBSIDY.

ENT HOUSE.



UPPER FLOOR PLAN.



FOUR APARTMENT HOUSE.

30 40 50

Wt P.512 20,000 7/20 M&E

Number of Apartments.	Amount of Subsidy.
Kitchen and—	
Parlour and three or four bedrooms	£260
Three bedrooms, or two bedrooms and a parlour	£240
Two bedrooms	£230

SIMPLE CONDITIONS ON WHICH THE SUBSIDY IS PAYABLE.

The conditions prescribed by the Scottish Board of Health are simple. They are prescribed merely to ensure that the Government subsidy is not squandered on undesirable houses, and they deal mainly, therefore, with health considerations.

For example, no house is eligible for subsidy which has less than three apartments, *i.e.*, a living room and two bedrooms; no bed recesses are allowed in any of the apartments, and every house must have, among other things, a scullery, a larder, a coal store, water supply (if practicable), w.c. (or where water and drainage are not available, an earth closet), bath (wherever adequate water and drainage facilities are available), etc.

The *minimum* floor areas of the apartments are prescribed as follows :—

Living room	180 square feet.
Parlour	120 ,,
1st bedroom	150 ,,
2nd bedroom	110 ,,
3rd bedroom	80 ,,
4th bedroom	80 ,,
Scullery	70 ,,

The subsidy will not be payable on a house containing superficial floor area exceeding 1400 feet.

FORMS AND STANDARD OF CONSTRUCTION.

You may build in stone or brick or concrete. If you propose to use another form of construction you should submit particulars to the Local Authority, who will consult the Scottish Board of Health, and advise you what subsidy is available. In the case of houses built by special methods, the subsidy may be reduced by one-third if the life of the house is estimated at less than 40 years.

DESIGN OF THE HOUSE.

The design of the house is a matter for yourself. The plans given with this leaflet are intended merely to give a general idea

of the kind of house available for the subsidy; and you may or may not adopt them for your house.

SPECIAL ASSISTANCE OFFERED BY BUILDING SOCIETIES AND LOCAL AUTHORITIES.

It is understood that Building Societies are in many cases giving special assistance to persons building houses eligible for the subsidy, and in some districts Local Authorities are giving facilities for the acquisition of convenient sites.

DATE FOR COMPLETION OF HOUSE.

It is the intention of the Government, subject to Parliamentary sanction, to extend the period for the completion of the houses to December 1921. You have, therefore, 18 months in which to complete your house.

APPEAL TO THE SCOTTISH BOARD OF HEALTH.

If the Local Authority refuse on unsatisfactory grounds to approve your plans, you may appeal to the Scottish Board of Health against their decision.

FULLEST INFORMATION AVAILABLE.

The Clerk to the Local Authority in your district or the Scottish Board of Health will supply you with any further particulars you may require.

SCOTTISH BOARD OF HEALTH,
121A PRINCES STREET,
EDINBURGH, *August* 1920.

Public Health (Tuberculosis) Act, 1921.

[11 & 12 GEO. 5. CH. 12.]

ARRANGEMENT OF SECTIONS.

[*Price* 1*d. Net.*]

CHAPTER 12.

An Act to make further provision with respect to arrangements by local authorities for the treatment of tuberculosis. [12th May 1921.] A.D. 1921.

BE it enacted by the King's most Excellent Majesty, by and with the advice and consent of the Lords Spiritual and Temporal, and Commons, in this present Parliament assembled, and by the authority of the same, as follows:—

Further provision with respect to arrangements for treatment.

1.—(1) Where the council of any county or county borough has, before the passing of this Act, made arrangements for the treatment of persons suffering from tuberculosis (including persons insured under the National Health Insurance Acts, 1911 to 1920) at or in dispensaries, sanatoria, and other institutions in accordance with a scheme approved by the Local Government Board or the Minister of Health, that council shall, for the purposes of this Act, be deemed to have made adequate arrangements for the treatment of tuberculosis so long as such scheme, with such modifications, if any, as the Minister may on the application of the council from time to time approve, continues in operation.

In the application of this subsection to Wales an agreement made with the King Edward the Seventh Welsh National Memorial Association, and approved by the Welsh Insurance Commissioners or the Minister of Health, shall be treated as equivalent to a scheme approved by the Minister of Health, and an application made by that association with the approval of a council shall be deemed to be an application of the council.

(2) Where the council of any county or county borough fails to make adequate arrangements for the

A.D. 1921.

treatment of tuberculosis at or in dispensaries, sanatoria, and other institutions approved by the Minister, the Minister may, after giving the council an opportunity of being heard, make such arrangements as he may think necessary for the purpose of such treatment.

Any expenses incurred by the Minister in arranging for such treatment may be paid in the first instance by the Minister out of moneys provided by Parliament, and the amount of any expenses certified by the Minister to have been so incurred shall be paid to the Minister on demand by the council and shall be recoverable as a debt due to the Crown.

This subsection shall not apply in the case of any council which at the date of the passing of this Act is deemed to have made adequate arrangements as aforesaid and which fails to continue to make such arrangements by reason only of the withdrawal of, or diminution in the rate of, the contributions made from the Exchequer before the passing of this Act to the councils of counties and county boroughs in aid of the treatment of tuberculosis.

After-care by councils of counties and county boroughs.

2. Without prejudice and in addition to any other power, whether under this or any other Act, every council of a county or county borough shall have power to make such arrangements as they may think desirable for the after-care of persons who have suffered from tuberculosis (including persons for the time being insured under the National Insurance Act, 1911, as amended or extended by any past or future enactment), and the provisions of this Act relating to committees and joint committees shall extend accordingly as though in those provisions the expression "treatment of tuberculosis" included such after-care.

1 & 2 Geo. 5. c. 55.

Approval of institutions.

3. Any approval by the Minister of Health of an institution for the treatment of tuberculosis may be given for such time and subject to such conditions as the Minister may think fit, and the Minister shall have power to withdraw any such approval.

Power to act through committees.

4. The powers of a county or county borough council in relation to the treatment of tuberculosis (other than the power of raising a rate or of borrowing money) may be exercised through a committee of the council or through a sub-committee of any committee, and the council and, sub-

ject to any directions of the council, the committee may appoint as members of the committee or sub-committee, as the case may be, persons (including members of insurance committees) who are not members of the council, being persons specially qualified by training or experience in matters relating to the treatment of tuberculosis, but not less than two-thirds of the members of such committee or sub-committee shall consist of members of the council.

Joint committees.

5.—(1) For the purpose of facilitating co-operation between county councils and county borough councils in the exercise of the powers conferred upon them by any enactment to make arrangements for the treatment of tuberculosis, the Minister may by order, with the consent of the councils concerned, make such provision as appears to him necessary or expedient, by the constitution of joint committees or otherwise, for the joint exercise by such councils of all or any of their powers in relation thereto, and any such order may provide how, in what proportions, and out of what funds or rates, the expenses incurred by such councils are to be defrayed, and may contain such consequential, incidental, and supplemental provisions as may appear necessary for the purposes of the order.

(2) Every such joint committee shall be a body corporate by such name as the order constituting the committee may direct, and shall have perpetual succession and a common seal, and may hold land for the purpose of their powers and duties without licence in mortmain.

(3) Any joint committee constituted under any enactment repealed by this Act shall continue in existence and have all the powers which may be exercised by any joint committee constituted under this section, and any order constituting such joint committee shall continue in force and have effect accordingly.

Powers of Metropolitan Asylums Board.

6. The managers of the Metropolitan Asylums District may, with the approval of the Minister of Health, enter into agreements with the council of any county or county borough for the reception of persons suffering from tuberculosis in hospitals or sanatoria provided by the managers.

Further provision with respect

7.—(1) The Minister may by order constitute an advisory committee for the purpose of assisting the

A.D. 1921.

to treatment of seamen.

council of any county or county borough in making arrangements for the treatment of any persons suffering from tuberculosis who are masters, seamen, or apprentices to the sea service or the sea-fishing service.

(2) An order under this section may provide—

(*a*) For the representation on the said committee of any society approved under the National Health Insurance Acts, 1911 to 1920, more than three-fourths of whose members are such masters, seamen and apprentices as aforesaid, and of the council of any county or county borough having a substantial number of such masters, seamen, and apprentices resident within their area, and may contain such other provisions as may appear necessary to the Minister for giving effect to the order; and

(*b*) If the governing body constituted under subsection (6) of section forty-eight of the National Insurance Act, 1911, as amended by section twenty-seven of the National Health Insurance Act, 1918, agree to contribute, out of the special fund referred to in the said subsection (6), towards the expenses of the said committee, for the appointment by the governing body aforesaid from among their own members of the representatives on the said committee of all such societies as aforesaid.

7 & 8 Geo. 5. c. 62.

(3) An order made under this section may be revoked or varied by another order so made.

Expenses.

8.—(1) Any expenses incurred under this Act by a county council shall be defrayed as expenses for general county purposes, or, if the Minister of Health by order so directs, as expenses for special county purposes charged on such part of the county as may be provided by the order.

(2) Any expenses incurred under this Act by the council of a county borough shall be defrayed as part of the expenses of the council in the execution of the Public Health Acts, 1875 to 1908.

A.D. 1921.

Short title, repeal, and application.

9.—(1) This Act may be cited as the Public Health (Tuberculosis) Act, 1921.

(2) The enactments specified in the second column of the Schedule to this Act are hereby repealed to the extent specified in the third column of that schedule.

(3) This Act shall not apply to Scotland or Ireland.

SCHEDULE.

Section 9.

Session and Chapter.	Short Title.	Extent of Repeal.
1 & 2 Geo. 5. c. 55.	National Insurance Act, 1911.	Subsection (3) of section sixty-four.
6 & 7 Geo. 5. c. 12.	Local Government (Emergency Provisions) Act, 1916.	Section sixteen.

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Public Health (Officers) Act, 1921.

[11 & 12 GEO. 5. CH. 23.]

ARRANGEMENT OF SECTIONS. A.D. 1921.

Sections.

[*Price* 1*d. Net.*]

CHAPTER 23.

An Act to amend the Law relating to the Appointment and Tenure of Office of Medical Officers of Health, Sanitary Inspectors, and Inspectors of Nuisances, and for other purposes. A.D. 1921.

[28th July 1921.]

BE it enacted by the King's most Excellent Majesty, by and with the advice and consent of the Lords Spiritual and Temporal, and Commons, in this present Parliament assembled, and by the authority of the same, as follows:—

Tenure of office of medical officer of health.

1. In cases to which this section applies, the medical officer of health of a local authority who by the terms of his appointment is restricted from engaging in private practice as a medical practitioner shall not be appointed for a limited period only and shall be removable by the authority with the consent of the Minister of Health or by the Minister and not otherwise.

This section applies to—

(*a*) the medical officer of health of a county borough where any portion of the salary of the medical officer was paid out of moneys voted by Parliament before it was constituted a county borough;

(*b*) the medical officer of health of a county district any portion of whose salary is paid out of the county fund of the county in which the district is situate and charged to the Exchequer contribution account.

Tenure of office and

2.—(1) In cases to which this subsection applies, the sanitary inspector of a local authority who is required by

A.D. 1921.

appointment of sanitary inspectors.

the terms of his appointment to devote the whole of his time to the duties of his office or to the duties of that office and of any other office or offices held by him under any local or public authority, shall not be appointed for a limited period only and shall be removable by the authority with the consent of the Minister of Health or by the Minister and not otherwise.

This subsection applies to—

(*a*) the sanitary inspector of a county borough where any portion of the salary of the sanitary inspector was paid out of moneys voted by Parliament before it was constituted a county borough;

(*b*) the sanitary inspector of a county district any portion of whose salary is paid out of the county fund of the county in which the district is situate and charged to the Exchequer contribution account:

Provided that, where more than one sanitary inspector is appointed by a local authority, the foregoing paragraphs (*a*) and (*b*) of this subsection shall apply only to the senior sanitary inspector as determined by the local authority.

(2) An urban sanitary authority shall have power to appoint two or more sanitary inspectors.

Definition of "sanitary inspector." 38 & 39 Vict. c. 55.

3. — (1) In this Act the expression "sanitary inspector" includes an inspector of nuisances appointed under the Public Health Act, 1875, and an inspector of nuisances shall henceforth be designated a sanitary inspector.

(2) In this Act the expression "local authority" means an urban or rural sanitary authority within the meaning of the Public Health Acts or a port sanitary authority.

Temporary appointments.

4. Nothing in this Act shall prevent a local authority from making, with the sanction of the Minister of Health, a temporary arrangement for the performance of all or any of the duties of a medical officer of health or sanitary inspector, and any person appointed by virtue of any such arrangement to perform those duties or any of them, shall, subject to the terms of his appointment, have all the powers and liabilities of a duly appointed medical officer of health or sanitary inspector as the case may be.

Application to existing officers.

5. The provisions of this Act relating to the removal from office of medical officers of health and sanitary inspectors shall apply to such officers and inspectors whether appointed before or after the commencement of this Act.

Application of s. 24 (2) of 51 & 52 Vict. c. 41.

6. Section twenty-four of the Local Government Act, 1888 (which provides for payments by county councils to local authorities in respect of the salaries of medical officers of health and sanitary inspectors), shall have effect as if the reference in subsection (2) thereof to the Public Health Act, 1875, included a reference to this Act.

Provisions as to London. 54 & 55 Vict. c. 76.

7.—(1) The provisions of paragraphs (*b*) and (*c*) of subsection (2) of section one hundred and eight of the Public Health (London) Act, 1891 (which relate to the removal and appointment of medical officers of health of metropolitan borough councils), shall apply to the chief or senior sanitary inspectors of metropolitan borough councils and to the medical officers of health and the chief or senior sanitary inspector of the port sanitary authority of the Port of London as they apply to the medical officers of health of metropolitan borough councils, and those provisions shall have effect accordingly.

(2) Save as provided by this section, this Act shall not apply to the administrative county of London.

Extent of Act.

8. This Act shall not extend to Scotland or Ireland.

Construction of Act.

9. This Act shall, except so far as it relates to the administrative county of London, be read as one with the Public Health Acts.

Short title and commencement of Act.

10. This Act may be cited as the Public Health (Officers) Act, 1921, and shall come into operation on the first day of April, nineteen hundred and twenty-two.

Printed by EYRE and SPOTTISWOODE, LTD.,
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National Sanatorium-Colony for all Forms of Tuberculosis

AT SOUTHFIELD, LIBERTON, NEAR EDINBURGH

The Royal Victoria Hospital Tuberculosis Trust

£25,000 required

The Work

THE TRUST is concerned with the **Investigation** and **Treatment** of **Tuberculosis** in all its forms and stages.

Tuberculosis occurs in every part of the body. Investigation has shown that its earliest manifestations are frequently elsewhere than in the lungs. Treatment should be directed to the first point of attack.

While tuberculosis occurs at all ages, it commonly begins in childhood. It should be met effectively at the moment of detection.

Sanatorium-Colony

To carry out this object, the Trust has resolved to establish a **Sanatorium** on the **Colony** principle where—

(1) Early cases of tuberculosis—in whatever organ and at whatever age—may undergo the most modern treatment for a sufficient time to give promise of effective cure.

(2) Suitable cases from any part of Scotland will be received.

(3) Investigation of the best methods of treatment and prevention will be carried out.

Property Purchased

The Trustees believe they have made a satisfactory beginning towards securing their object by the purchase of the residential

estate of " Southfield," in the Parish of Liberton, about two miles from Edinburgh. The existing Mansion House is beautifully situated, and surrounded by 33 acres of garden and suitable land.

The property, which had been reported on most favourably by the Architect to the Trust and another building expert, was acquired on most advantageous terms.

It is fully expected that the first group of patients will be received in two or three months. The property is capable of being made available for the accommodation of an increased number.

War Patients

Sailors and Soldiers and War Workers — men and women **whose tuberculosis has developed while on Active Service—and their dependants will have a preferential claim.** The Sanatorium will be essentially a **National Institution open to suitable cases from the whole country.**

A National Memorial

It will form a perpetual Memorial of the nation's gratitude to, and sympathy for, those who have sacrificed their Health in its service.

The new Institution will combine all the uses of the **Sanatorium—The Farm Colony, The Training Centre, and the School**—for Patients requiring prolonged treatment. The scientific study of these cases, it is hoped, will result in new departures in treatment and prevention.

Apart from the purchase price of approximately £10,000 already paid, it is reckoned that £15,000 will be required for alterations and immediate extensions, and for equipment and stocking. Beyond this, a considerable sum will be necessary to place the Colony on a sound financial basis.

It is expected that the maintenance of the Institution will be met, in part, by an increase in the ordinary subscriptions to the Trust, which already has most generous support throughout Scotland, and, in part, by contributions received from Health Authorities who,

it is hoped, will avail themselves of the Institution for the treatment of the class of patient for whom the Institution will provide, and will thereby benefit largely from the experience to be gained by its operations conducted under specialist guidance.

Scientific Investigation

Scotland has already done much in investigating and reducing the ravages of this scourge, and the Trust look forward with much hopefulness to the foundation of this new Institution as a further step in the line of progress. The "Southfield" establishment means a development of first importance in connection with the cure and prevention of tuberculosis.

An Appeal is therefore confidently made to the thoughtful public to aid the Trust in the great project.

Memorial Beds

The Committee will be glad to gratify the wish of any donor who may desire to endow and name a ward or bed in the Sanatorium-Colony. They propose to affix to beds in perpetuity the name of any benefactor to the extent of £1000 by donation or legacy who so desires it. They believe, with the late Lord Derby, that there can hardly be "a more satisfactory method "of keeping alive the memory of a lost relative or "friend than by attaching his or her name perma- "nently and inseparably to an institution which is "intended to relieve suffering, and may for many "generations to come be a benefit to the living as "well as a remembrance of the dead."

In Name of the Committee of Management,

RALPH ANSTRUTHER,
President.

CHARLES SCOTT DICKSON,
Vice-President.

Contributions will be received and acknowledged by Mr. L. B. BELL, C.A., the Treasurer of the Royal Victoria Hospital Tuberculosis Trust, 42 Castle Street, Edinburgh.

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FORM OF LEGACY OR BEQUEST

Any one desirous of leaving a Legacy to The Royal Victoria Hospital Tuberculosis Trust may do so in the following terms:—

"I give and bequeath to **The Royal Victoria Hospital Tubercu-**
"**losis Trust,** payable to the Treasurer of the Trust for the
"time being, the sum of

" free of Legacy Duty."

ROYAL VICTORIA HOSPITAL TUBERCULOSIS TRUST.

APPLICATION FOR THE BENEFITS OF THE TRUST

ON BEHALF OF _____

QUERIES.		ANSWERS.	
1. Name of Applicant in full.			
2. Postal Address.			
3. Age.			
4. Occupation, stating whether Insured under National Insurance Act.			
		AGE.	OCCUPATION.
5. State number in household, their ages and occupations.	Husband		
	Wife		
	Sons		
	Daughters		
6. State approximately Income of household.			
7. Duration of Illness.			
8. State the purpose for which assistance is asked from the Trust. *See Regulation No. III.*			
9. State the circumstances which render such assistance desirable.			
10. If applying for treatment in a Sanatorium, state whether patient has had previous Institutional treatment, and, if so, where.			

DATE.

DECISIONS OF COMMITTEE.

Application No. _____

ROYAL VICTORIA HOSPITAL TUBERCULOSIS TRUST.

APPLICATION

ON BEHALF OF

_____

Address _____

_____

Received _____ 191 .